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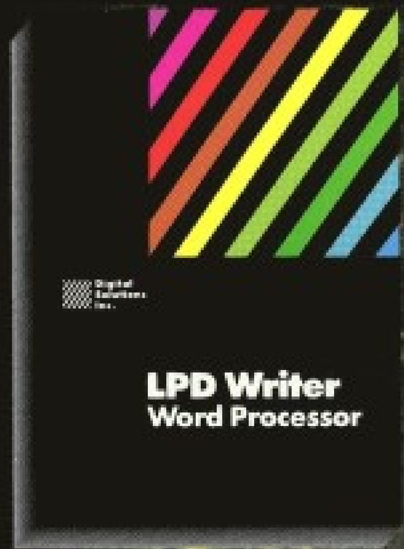
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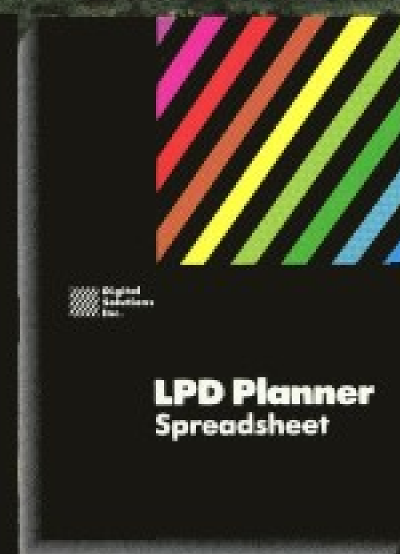
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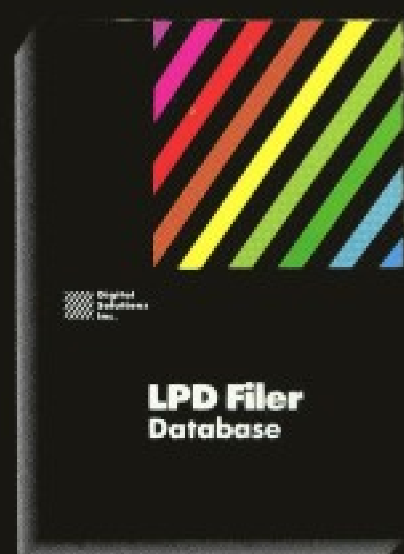
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Cover photograph
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NOVEMBER/DECEMBER 1986

C O N T E N T S

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Zeitgeist

By Guy Wright

How have you been? Two months seems like a long time between issues. Many of you have told us that it is too long a time, and we agree. Now if we can just convince the powers that be that we should go monthly, we will be all set. Of course, that would mean twice as much work for us, but that is a small price to pay.

This issue is sort of a holiday sampler of Amiga items. We have articles that cover everything from Basic to graphics to C programming to telecommunications. We also have a monster buyer's guide to software and our Editor's Choice Awards. Hopefully, there is something for everyone in this issue.

Wrapping up 1986 and looking forward to 1987, I think you will find that *AmigaWorld* is going to be covering some very exciting areas. Desktop video is one of those areas where we have seen a lot of interest from you, the readers, and from companies like Aegis, Byte-by-Byte, Electronic Arts, etc. Our next issue will be devoted to Desktop video. What is it, what it means, how to do it, and who is doing what.

Beyond that, we have plans to cover the wide variety of hardware expansion devices and enhancements available. From 512K upgrades all the way to the super-charger boxes that will enable your Amiga to outcompute a Vax. A lot of you readers have told us that one of your main areas of curiosity is memory expansion, and if all goes well, we shall be investigating all the multi-megabyte memory boards and hard-disk drives we can lay our hands on.

Beyond that, we will be covering graphics and music, business and programming, glamorous applications and the fundamentals of various languages. That is where you come into the picture. While we are still thinking about the future, we would like your feedback. Let us know what things you would like us to cover in 1987, and if enough people feel the same way, then the odds are very good that we will. 1987 should be a very good year for you, the Amiga and us. Almost all of the bases have been covered (in terms of software and hardware) to set people free to do all those things that had been promised for so long. The power of the Amiga is now out of the box and available to the rest of us mere mortals. (I am defining a mere mortal as anyone who doesn't program in C and couldn't get past the second chapter of the ROM Kernel Developer's Manual, which includes myself.)

I think that we have just started. *AmigaWorld*, judging by your responses to the last few issues, is getting better with every issue and will continue to do so. The software and hardware companies have made major commitments to the Amiga, with more and more companies that started out with a wait-and-see attitude deciding that the wait is over. And finally, you have begun to explore new areas and let us know about them. All of these things combined are making *AmigaWorld* better, and are making owning an Amiga more exciting. The machine started out with some powerful hardware and flexibility, but it takes people to put it all together.

Oh yeah. Happy holidays and a magnificent New Year! ■

Repartee

Any Day Now

Some weeks ago I decided to buy the Amiga after three years with a C-64 and also subscribing to AmigaWorld. *I think I get better information out of American computer magazines than out of German ones. Your articles are more serious, reliable and go to the root of a subject.*

I know you have been enjoying your Amigas for more than half a year now. Not so here. Everybody's been talking about the new machine for months, and ads in magazines and on the radio started some weeks ago, but the dealers just don't have any Amigas yet. Commodore Europe promises to deliver on a certain date, but then don't do so and come up with excuses and a new release date. There are U.S. versions (transformed to our 220 volts) around, but due to your NTSC standard and 60hz power, they don't work correctly. Somehow the European PAL version is delayed. I wonder when I will finally get my machine.

Martin Mathis
Zurich, Switzerland

Support for Transformer

I strongly disagree with the conclusions reached by your reviewers of the Transformer [Van Name and Catchings, Sept./Oct. '86, p.97]. They spent much time panning its bad features and cast many (unproven) aspersions as to its IBM compatibility, but failed to appreciate the system's real worth.

As a Transformer owner, I can take home files from the IBMs at the office and run them at my leisure. I am not looking for fast sorting or file copies—I can always have another coffee while the program does its thing. I do not need fancy color graphics. That's what I bought the Amiga for! The ability to run dBase III, Lotus, Wordstar, etc. is what counts for me.

I have not yet found a non-graphics MS-DOS program that fails to run correctly. Even Sidekick will correctly coexist in RAM with other main programs. Even more amazing is that with IBM DOS 3.2 or Toshiba's battery portable DOS 2.2 you can format your 3.5-inch and 5¼-inch disks to 80 tracks and obtain 720K on each disk. The Transformer will happily read mixtures of 40- and 80-track disks.

If, like me, you are an occasional MS-DOS user, then you should run to your nearest Amiga dealer and pick up the Transformer system at the current giveaway price of $200 to $250. The 80-track, 5¼-inch drive is worth that much!

F. Turner
Santa Cruz, CA

The American Way

I just don't understand how people think. I'm referring to the letters complaining that Commodore is offering no adjustment for Amiga purchasers who bought their machine before the "free monitor" deal.

How can you expect Commodore to refund your money? Did RCA refund money when they dropped the price on your TVs? Did Chevy refund money when they offered 5% financing? Did AT&T offer refunds when they dropped the price of their 6300 computer? Does the grocer refund money when you buy a gallon of milk and it then goes on sale a week later?

Let's be realistic. Prices change. That is the Amercian way! Not that I would argue with Commodore if they sent me some free software or money, but I surely don't expect it. Did you write the manufacturer of that $85 calculator you bought in 1978 and complain that it's now selling for $6.99? This is the electronics industry! Prices change every day. That's the way it is and I am sure it won't change for some time. I bet you're really going to feel bad in a few months when they come out with a computer that outperforms the Amiga.

If your dealer told you the prices wouldn't drop, I would find another dealer—that one lies. If he was rotten enough to tell you that, go back and tell him—not Commodore—that you want your money back.

Scott Baldassari
Cary, IL

I wonder if people who feel that Commodore owes them the difference between the Amiga's original and later reduced prices would be rushing $495 checks to Commodore if the price had increased *after they bought their Amigas!*

I, too, was an early buyer. I was in my dealer's showroom in October '85 when his first shipment of computers and montiors arrived from the factory (having given him my $500 deposit a month earlier). Like all of the early buyers, I paid top dollar for the Amiga and its software—because I wanted it immediately!

In a free-enterprise system, you have to buy at today's price if you want it today. Otherwise, you must wait. . .and wait. . .and wait.

William H. Rideout
San Diego, CA

Another Textcraft Trick

I would like to remark about the "Textcraft Tricks" article by Pebber Brown [Sept./Oct. '86, p. 92]. Since purchasing my Amiga in December, I have not been able to get proper output on my Gemini 10X printer. A letter, two calls to Commodore and many hours of trying various suggestions resulted in no solution.

Finally, I noticed that my version of Textcraft was installed under version 1.0 of Workbench. After installing Textcraft under Workbench 1.1, the Gemini seems to work quite well without the procedure recommended by Brown.

I thought some of your readers might be having similar problems and should check which version of Workbench their Textcraft is operating under.

James E. LaPorte
Blacksburg, VA

Desktop Publishing

I am interested in getting into desktop publishing, but so far I see no evidence that software developers are interested in producing publishing software for the Amiga. It would seem that the Amiga is tailor-made for this type of work and could blow the Mac off the page!

Can you give me any reason to be optimistic about software development in the publishing area? I realize the other capabilities of the Amiga, but my decision to buy an Amiga will be based on its usefulness in the area of publishing.

Richard J. Norgard
APO, New York

S. Anthony Studios of San Francisco, CA is releasing utilities that allow you to use the Amiga with the Apple LaserWriter printer. See the software buyer's guide and the What's New? column (both in this issue) for more info.

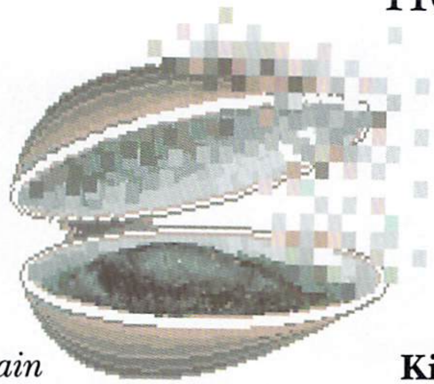
Also, Computer Food of Atlanta, GA is working on a program called Art Director, which allows you to do graphics and text page layout on the Amiga.

—Editors



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Hors d'oeuvres



Once again the table has been set with an assortment of gourmet goodies. Pull up a chair, a napkin. . . and your keyboard. We have received many good tips from you closet Amiga short-order cooks. Keep them coming. Imagine the chopfallen looks on everyone's faces the next time you walk into your user group meeting—or Amiga dealer—wearing an official AmigaWorld *T-shirt—you can almost taste the potential for instant stardom!*

Sure, we could pay for the hints you send in, but you would just spend the money on something frivolous or fattening, wouldn't you? T-shirts, on the other hand, are a tangible, visual affirmation of your cleverness! If you have something you think would adorn our platter, just drop it in the mail along with your T-shirt size to *AmigaWorld* Hors d'oeuvres, 80 Pine St., Peterborough, NH 03458. And remember: Something could sneak past us that doesn't live up to expectations. So *make backups of any disks you plan to alter* with any of these tips. And let us know if you find an appetizer printed here that isn't all it's cracked up to be.

Killing RAMdisks

By now we have all heard how to make a RAMdisk filled with system commands. I thought that maybe some people would like to know how to get rid of a RAMdisk to free up memory. Use ED to create the following file; name it KILLRAMDISK or something similar:

```
SYS:C/ASSIGN C: SYS:C
DELETE RAM:C/#?
DELETE RAM:C
```

To use it just type: EXECUTE KILLRAMDISK. Remember, when creating your RAMdisk in the first place, it is better to copy only the commands you need most. Then, for the occasional times you might need an obscure command like ECHO, for instance, just type SYS:C/ECHO to use it.

Vincent Lee
Concord, CA

Multi-user

One of the Amiga's most useful features is multitasking. Unfortunately, it is not a multi-user machine. There is, however, an undocumented feature that allows it to be used as one. While in a CLI window, type NEWCLI SER: . This will open a new CLI process to the serial port. This allows you to hook up an external terminal to run CLI programs in the background. To end the CLI process, just type ENDCLI SER: and hit a lot of Returns to flush out the buffer.

Unfortunately, I know of no way to bypass the buffer between the terminal and the computer. I have heard that NEWCLI SER:RAW might do it, but I haven't gotten that to work yet.

Vincent Lee
Concord, CA

Editor's Note: Perhaps some other clever multi-user types out there have some suggestions for bypassing the buffer?

More Date/Time Startup Comments

Thank you for publishing my "Date/Time Startup" tip in the July/August issue of *AmigaWorld.* Unfortunately, I failed to warn you of a bug I discovered in the DATE ? command. The command DATE ? *does not work if there is a comment following it on the same line.* All you have to do is delete the comment or move it to another line. Thanks again.

Marcus Brooks
Austin, TX

Different Date/Time Solution

In your last issue of *AmigaWorld*, you published a short program called Date/Time Startup. I typed it in and got error messages. After some fiddling I corrected the offending lines and the program works fine. Every occurrence of the DATE ? command should be changed so that the semicolon indicating a comment should *immediately* follow the question mark. So the lines should read:

```
DATE ?;      request date
```

and

```
DATE ?;      second chance
```

It seems this is necessary since AmigaDOS will interpret even the semi-colon as part of the command if it does not directly follow the question mark. Kind of a funny quirk of the DOS, but a very real one.

Scott Sexton
Lakeside, CA ►

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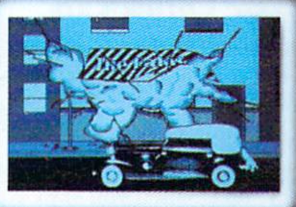


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Date/Time Sans Prompts

Many AmigaDOS commands generate their own prompts when they expect input. For example, the DATE ? command causes the prompt TIME,DATE,TO = VER/K to appear on the screen. You can suppress the command prompt by using the redirection operator > and the NIL device. Thus DATE >NIL: ? will send the prompt into computer never-never land without generating any error conditions. Just be sure to place the redirection operator before the parameter requester ?.

Roger Le Vine
Highland Park, IL

Hidden Debug Menu

For a bit of fun, type this command from a CLI window: LOADWB –DEBUG. Now go to the Workbench and select the Special menu. While still holding the mouse button, slide the pointer to the right and voila! A hidden menu. The items in this menu cause debugging information to be sent out the serial port at 9600 baud. Anyone with an RS-232 terminal lying around can tap into this feature.

Bryce Nesbitt
Berkeley, CA

Some Say

While knocking around on a friend's Amiga a few days ago, we found some interesting features of the SAY command. Typing the keyword SAY from the CLI brings a window to the screen, which shows some of the uses of the SAY command. While these examples are rather vague, they pointed us in the right direction. Here is the syntax and an example of how to get the Amiga to read text files to you:

```
Syntax:
   SAY-X (dir)/(filename[.ext])
Example:
   SAY-X S/startup-sequence
```

I hope some of your readers will find this useful and have as much fun with it as we have.

George Wallace
San Antonio, TX

Amiga Hooked RugCraft

I make hooked rugs using the old-fashioned technique of cutting woolen fabric into narrow strips and pulling them through a burlap backing. I work mostly from my own designs and my biggest problem is in the use of color. I have never been confident that the colors I have planned will produce the effect I'm aiming for.

Using my Amiga and DeluxePaint, I am able to get an advance look at my rug, making any necessary corrections before I begin hooking. If I am using various colored wools as they are, I can duplicate their colors on the screen. If I am going to do any dyeing, I create the colors with the computer first, to make sure that they will go well together, then I get out the dye pots.

When I have the dye pots simmering, wet wool hanging all over the kitchen, burlap on the rug frame, and my Amiga brilliantly displaying my designs, it is amusing to observe the blend of old-time handicraft and modern technology.

Susan Luckstone Jaffer
Waymart, PA

Mouse Sound Waves

I think you guys went to a lot of trouble playing with the sound waves in your July/August issue. This short program in Amiga Basic lets you draw your sound wave with the mouse; when your pointer is at the right side of the window, you can hear what the wave sounds like. Play around with it and see what kind of fun you can have.

```
DIM It%(255)
WINDOW 3,"Sound Wave",
  (0,0)-(300,128),8,-1
CheckMouse:
  z=MOUSE(0):x=MOUSE(1):y=
    MOUSE(2)
  IF x<300 THEN SOUND (x-290)
    *3,1,255
  IF z<>0 THEN GOSUB Change
GOTO CheckMouse

Change:
  IF x>255 THEN x=255
  IF y>128 THEN y=128
  PSET(x,127-It%(x)),0
  PSET(x,y),2
  It%(x)=127-y
  WAVE 0,It%
RETURN
```

Sourabh Niyogi
Wheaton, IL

Alternate Character Sets

Almost every person who has played around with the CLI has seen the alternate character set. You hit the wrong key or try something new and...BOOM! These funny looking characters appear instead of the normal character set. While fooling around the other day, I discovered two very useful keystrokes: CTRL O (the letter "O," not the number zero) will turn on the normal character set and CTRL N will turn on the alternate character set. So, if you do something funny and see the alternate character set filling your screen, hit CTRL O and you will be back in business.

John D. Hamilton
Fresno, CA

Getting Behind Textcraft

Some software, like Textcraft, has no documentation for how to change screens with the Amiga-N and the Amiga-M keystrokes. For instance, in Textcraft, most people are probably selecting the Quit option from the menu whenever they want to see the Workbench screen (e.g., to move an icon for another project into the same drawer as the Textcraft project). But there is a much faster way to return to Workbench without breaking out of Textcraft: Just open the Workbench Clock before opening Textcraft. Then, from within Textcraft, Amiga-N will switch you to the Workbench screen and Amiga-M will return you to Textcraft.

Andrew Lichtman
Nellie Gail Ranch, CA

Editor's Note: This method will work using the Calculator, Notepad or other similar programs also, as well as the Clock. (You will want first to move a copy of the clock—or whatever program—onto your Textcraft disk so you can boot up with the Textcraft disk.) The important thing is to have another task running before Textcraft loads. Since Textcraft doesn't allow directory-path switching from within—short of saving blank documents to other directories—this is indeed a handy procedure. I am going to run the Gizmoz alarm clock behind Textcraft to remind me when (among other things) it's time to go home!

Amiga Basic Quick Cut

Here is a little trick I stumbled across for replacing something in an Amiga Basic program without using the CUT function. Just use the mouse to highlight the portion of the program that needs replacing, then start typing in the new text. When you start typing, the highlighted portion is deleted. Aside from saving a couple of keystrokes (Amiga-X to cut the selected text out), this technique has the added advantage of not changing the contents of the buffer from the last time the CUT or COPY functions were used.

Mike Gibson
Provo, UT ■



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Getting It On-Line

Discover how you can share knowledge, opinions and ideas with Amiga owners around the world.

By Peggy Herrington

If you're just getting your Amiga under control, you'll find that a modem, a telephone line and a network can be especially helpful. And even if you already have your Amiga under control, you should find a network to be of great value. Either way, in addition to your computer system, you'll need a modem with a special Amiga cable and a terminal program so that you can communicate over standard telephone lines.

Connecting to a network allows you to get the most out of this equipment. Not only can you transfer programs and text files, you can talk with users all over the world. Networks are extensive, and since they charge for the time you're connected to the host computer, you should have an idea of what you want to do and how to do it before going on-line. For example, instead of working through the menus, you can use the shortcut MOVE 555 at any prompt on GEnie, General Electric's consumer network, to get the main menu of the Amiga RoundTable:

GEnie AMIGA Page 555

StarShip Amiga RoundTable

Library: ALL Libraries

1. Amiga RoundTable Bulletin Board
2. Amiga Real-Time Conference
3. Amiga Software Libraries
4. Old Club Bulletins 860206
5. How to use the Bulletin Board...
6. Note on XMODEM...

All the networks we'll explore here have areas devoted especially to the Amiga. These areas are called special interest groups (SIGs), clubs or forums and are usually divided into sections: a message area that allows you to post questions and comments, a conference area featuring real-time live discussions, and an area where public domain programs and text files can be accessed. Some networks offer system bulletins and access to electronic mail and shopping areas. Keep in mind that menu choices only indicate what may be there. It's the users of a network, aided by the SYstem OPerators (SYSOPs), the folks in charge, that make a network what it is—be that good, bad or mediocre.

On-line Messages

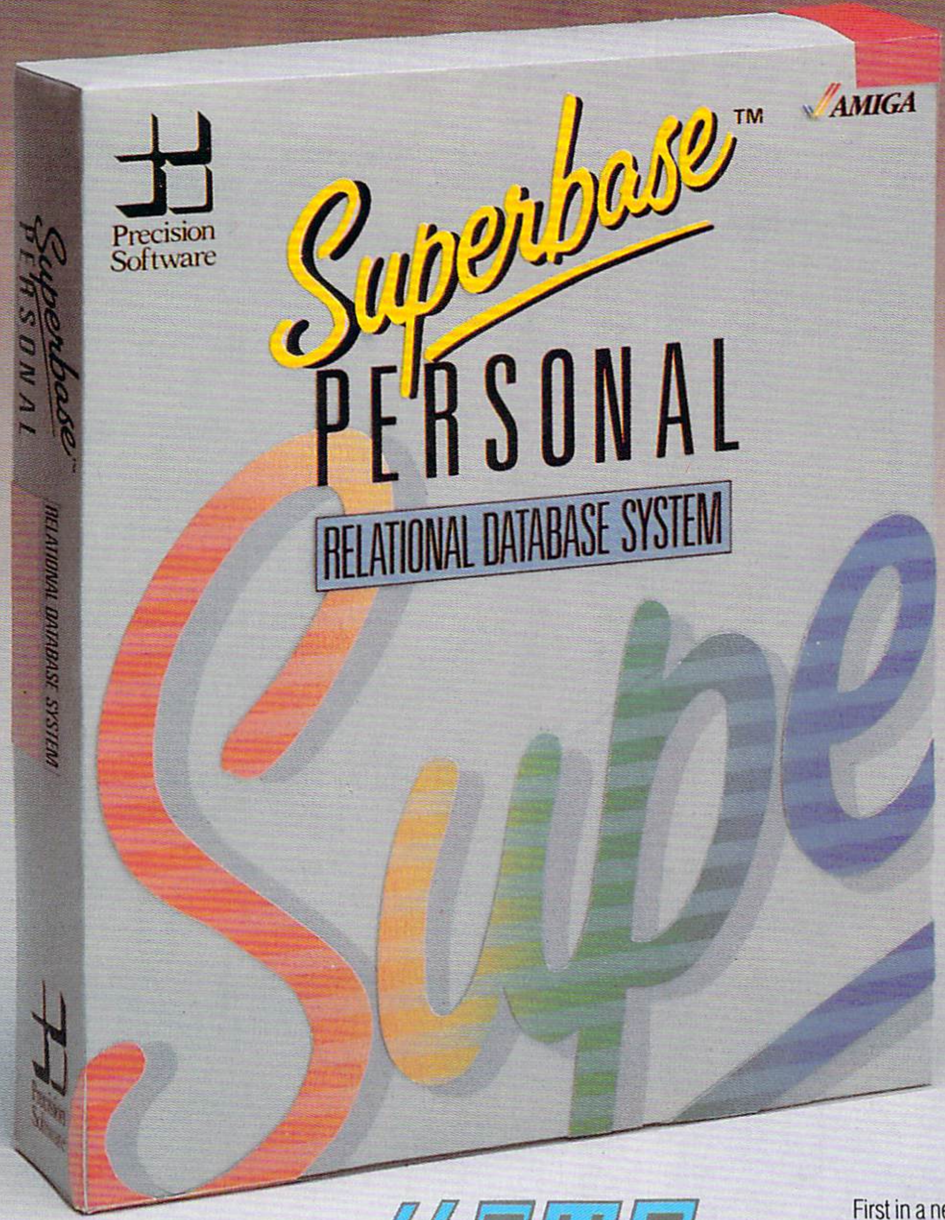
An active message base can be a valuable asset. Since there is so much activity on a network, messages are categorized by subject. The Amiga Forum on CompuServe, for instance, categorizes both messages and data libraries where programs and text files are stored like this:

CompuServe AmigaForum
Data Library Sub-topics:

0 Help/Announcements
1 Community Square
2 Games
3 Audio/Video
4 Telecommunications
5 Amiga at Work
6 Utilities
7 Programming
8 Hardware

Let's assume you're thinking about purchasing a word processing program. Topic 5 would be the place to look for relevant messages. Instead of reading them on-line, it would be more cost-efficient to capture them in your terminal program buffer at 1200 baud, sign off the network and read them off-line at your leisure. This would also apply to the directory of programs and text files in Data Library 5, which both can be saved to disk for sharing with friends or future reference.

All networks have methods of searching out information, and learning how it's done—mainly through the manual provided—can be very advantageous. If you don't find what you're looking for in the messages, which can supply opinions on commercial word processors, or a library directory, which may offer a public domain program you can download, you can sign back on and post a message asking for comments from other members. With a little practice, you can compose the message beforehand, sign-on and quickly upload, or send it. An option could be to see if anyone is in the conference area. People on-line are usually very willing to help a fellow owner, especially if it's their opinion that is being sought. If no one's available, check the bulletins for regularly scheduled conferences. Most ►









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Amiga Bulletin Board Systems

Bulletin board systems (BBSs) are often privately owned and available part time on personal telephone lines. Since they tend to come and go, it's a good idea to call the first time by voice to verify that you get a carrier signal, then to call back with your modem.

State/City	Name	Call with Modem	Hours	Baud	Remarks
AL		205/928-9231	6PM–6AM		
AZ	MegaHacker	501/988-2064	24 hours		
AZ Phoenix	Amiga Talk	602/846-3901	24 hours	3	
CA Los Angeles	AmigaBoard	213/478-9788		3/12/24	
CA Los Angeles		213/325-0213			
CA	Developers Xchg	408/372-1722		12	MaxiSoft Board
CA Castro Valley	Sphinx Society	415/581-9452			
CA Sausalito	THE WELL	415/332-6106	24 hours	12	$2/hr + $8/month
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CA San Francisco	WELCHNET	415/664-2811		12	Fidonet node
CA	BBS-JC	415/961-7250	24 hours	3/12/24	Amiga Sec.
CA Del Mar	Dreamscape	619/755-2863	24 hours	3/12/24	San Diego Amiga User's Group
CA	Coast BBS	707/964-7114	24 hours		Erase first 0 at name
CA Costa Mesa	Amiga's Den	714/646-2723	24 hours	3/12	
CA		714/264-6748	24 hours		
CA San Clemente	VIVID EXPRESS	714/493-6094	24 hours	3/12	BBS source available
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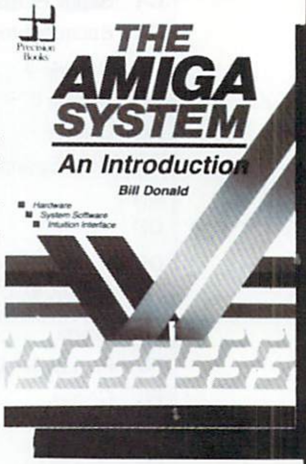
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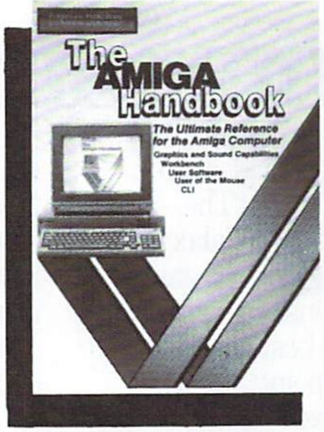
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CO	Amy BBS	303/752-0247		3/12/24	
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FL		813/924-2626			
FL Jacksonville	Casa Mi Amiga	904/733-4515	24 hours	12	16MB Fidonet node
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IL	Wovsed 200	618/378-2133	5PM–8AM	3/12	Use Username: GUEST
KS	MegaStar	316/251-7417	5PM–6AM	3/12	

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MD		301/445-3777			
MI Grand Rapids	Big Blue	616/245-6635	24 hours	3/12/24	53MB Fidonet node
MI Novi	Novi Downld	313/348-4479	24 hours	3/12	Voice first: 348-4477
MI Canton	Canton Computer	313/459-6930	7PM–11PM		
MN Minneapolis	MindTools	612/542-8980		3/12/24	
MN		612/535-6175	24 hours	3/12/24	Stan Kalisher—SYSOP
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NE Bellevue	Wind Dragon	402/291-8053	24 hours	3/12	Fidonet 14/614
NH Laconia	Sanctuary	603/524-0136	24 hours	3/12	
NJ Englishton	Amy Palace	201/446-1424	24 hours	3/12	Amiga, Atari, Mac
NM Albuquerque	RCPM	505/299-5974	24 hours	3/12/24	Amiga sec.
NV Las Vegas	Amiga Pipeline	702/644-0755	24 hours	3/12	
NY New York	AMUSE	212/269-4879		3/12/24	Fidonet node 107/34
NY New York	68000 BBS	212/927-6919		3/12/24	68000 General board
NY		212/534-2858	1AM–6PM		
NY	A.M.U.G.	516/234-6046	24 hours	3/12/24	BBS-PC! on Amiga

State/City	Name	Call with Modem	Hours	Baud	Remarks
NY Brightwater	AMIGA ADVANTGE	516/662-4881		3/12	
NY		516/689-3105			
NY	5th Generation	716/377-3985	24 hours	3/12	
NY Buffalo		716/873-5321	9PM–9AM (Weekends 24 hours)	3/12/24	
NY New York	Apples On-Line	718/746-1140	24 hours	3	Amiga files area
NY	MUSICNET	914/442-4006		3/12	MIDI Board $75/year
NY	Hobbit Hole	914/243-6219	24 hours		
OH	CA-AUG BBSA	216/341-4452			
OH Dayton	AmigaBoard	513/898-0702	24 hours	3/12	
PA		814/539-5701			
TN Nashville	Comm BBS	615/885-4162	24 hours	3/12	
TN	Connection	615/868-7860	24 hours	3/12	
TN	THE DUCK POND	901/755-5330			Fidonet node
TX Dallas	Rising Star	214/231-1372		3/12/24	Fidonet 124/13 Sec.3
TX Dallas	Nomads Nook	817/926-8922		3	
UT Salt Lake	TechniSoft	801/264-8290	24 hours	12	Fidonet node 15/464
WA Seattle		206/324-0830	5PM–8AM (Weekends 24 hours)	3/12	
WA		206/874-6381	24 hours	3/12	Fidonet node
WI Milwaukee	PSA-BBS	414/278-5390	4PM–9AM (Weekends 24 hours)		
CANADA					
Victoria BC	Micro-SysSof	604/479-8510	24 hours		
New Brunswick	AmigaWorld*	506/357-9660			
Ontario	WDIX	416/668-2078	24 hours	3/12	Whitby Info Exchange
Ontario	Amiga Gateway	416/433-7077	6PM–10AM (Weekends 24 hours)		
Ontario	ET's	807/344-0302			

*Not associated with *AmigaWorld* magazine.

SIGs hold them at least once a week and many also hold conferences with industry professionals.

Public Domain Programs

Although once on-line you can get help with just about anything, opinions aren't all you should expect. Transferring public domain programs to your computer, or "downloading," is one of the best reasons to join a network. Some public domain programs are as functional as commercial software and can be yours for the cost of downloading them. Although they often don't have all the bells and whistles, they are contributed by programmers of all persuasions and can be as varied in application as their more expensive counterparts. Since they are neither copyrighted nor copy-protected, you can study or alter them and share them with friends. Occasionally you'll run into a Freeware or Shareware program requesting a small donation if you find it useful. If you're studying programming, public domain programs can be a great supplement to a language package and a good book. You can also download text files that contain information such as directions for making cables, reviews of products, IFF file formats, industry news and help files for printers. There's always a way to get a list of the programs and text files available on-line. Here, for example, is PeopleLink's library command structure:

American PeopleLINK
You are now in the COMMODORE Club library!
CLUB LIBRARY

1—Quick SCAN library entries	/QSC
2—READ library entries	/REA
3—POST a library entry	/POS
4—RETURN to Notice Area	/NOT
5—SELECT another club	/SEL
6—Exit Clubs	/QUI
7—Advanced options	/ADV
8—Enter conference area	/CON

You can usually read a brief description of a file before downloading.

When transferring actual program files, always use an error-checking protocol such as Xmodem (see "On-line Advice," p. 26), but remember that this takes longer. Downloading at odd hours when there are fewer people on-line usually means quicker transfers. The only reason why text files can be captured in your buffer without using a protocol is that errors can be easily detected by simple observance. Program files, on the other hand, are not as easily put into context. Imagine how long you'll be debugging the program if one character, placed in just the right spot, is wrong. So be forewarned: use protocol in program file transfers.

The Networks

Although rates given in the accompanying chart (pp. 18–22) are by the hour, commercial networks charge for each minute you are on-line. CompuServe and GEnie have direct telephone lines into hundreds of U.S. cities and most other networks include the cost of independent carriers such as Telenet, Tymnet and Uninet, which provide local phone access. Only people ►

The On-line Line-up

With the caveat that this is probably the fastest-paced industry ever devised by man (or woman) and anything can change overnight, here's some of what you'll find as you travel the fiber-optic cables of America.

American PeopleLink (800/524-0100 voice for information) offers one of the best Amiga public domain file libraries. And the price is right: $4.25 an hour for any baud rate up to 2400 on evenings, weekends and holidays (non-prime time), with discounts during "happy hours." There were about 300 program and text files to download as of this writing, and that's not counting the public domain disks from the Amicus User Group. The only weak link is its inactive message base. You won't be charged the $10 sign-up fee if you join by calling 800/826-8855 with your modem (from Illinois call 312/822-9712).

Byte Information eXchange (BIX) (800/227-2983 voice, 603/924-7681 in New Hampshire), is owned by *Byte* magazine and is the place to be if you're an Amiga developer. The Amiga conference has hundreds of meaty messages each week and costs $25 to join if you subscribe to *Byte*, $39 if you don't. 1200-baud, non-prime-time access is $11 an hour. There's no live conferencing, but there are two Amiga message areas: the Amiga Conference (type JOIN AMIGA at the ":" prompt) and a lighter-weight Amiga.user. Both offer weekly digests, which are message summaries compiled by conference moderators that you can capture and study off-line. You can pick out messages and tutorials by topic and number, then simply sign back on and capture only the information you need, fast. You can ask *Byte* for details on joining by modem.

CompuServe's (800/848-8199 voice, from Ohio 614/457-8650) new Commodore structure includes the Amiga Forum (type GO AMIGAFORUM from any prompt). Non-prime-time, 300-baud access is $6 an hour, 1200 baud is $12.50 an hour, both plus $.25 an hour for using a direct line or $2 an hour for a carrier service. Downloading Amiga programs is sometimes easier than it is from other networks with CompuServe's "B" Protocol (see "On-line Advice," p. 26). SYSOPs and users are currently working on an Amiga Binary format that will allow entire disks to be transferred intact. Check out CompuServe if you're interested in network resources beyond the Amiga—it's as extensive as they come. To join, buy a CompuServe Starter Kit (all expiration dates have been extended indefinitely).

Delphi (800/544-4005 voice, 617/491-3393 from Maine). Amiga music and art are in the Micro Artists Network, while other topics are covered in the StarShip Amiga. (Choose Groups and Clubs at the main menu or type GR MIC or GR AMI, respectively, to go there directly.) Up to 2400 baud is $7.20 an hour during non-prime time, and if you can handle Delphi without the user manual, join by modem through Uninet or Tymnet to bypass the $49.95 sign-up fee: enter JOINSTARSHIP at the name prompt and KICKSTART as your password. The StarShip Amiga has a nice selection of public domain files conveniently grouped for downloading. The Performing Arts Network (PAN) is an extensive service for MIDI musicians and has well-known musicians participating. Call 215/489-4640 for information.

The Electronic Village is scheduled to launch in October (ask 800/555-1212 for their listing). It will be available in three stages: first simple ASCII, next with live chatting and program transfers with a special terminal program, and finally NAPLPS on-line graphics and text. Founders say these activities will be individually and competitively priced and will be available through both private and common carrier services. An Amiga section is also planned.

GEnie (voice 800/638-9636, ext. 21), General Electric's consumer network, costs $18 to join and is accessible by direct GE phone lines with a $2 an hour surcharge from outlying areas. Non-prime-time access is $5 an hour up to 1200 baud and uploads (sending files for others to download) are free. In my opinion, file transfer on GEnie is the fastest and most error-free in the industry and there are lots of Amiga files that are worth having. A new GEnie command set (type USERS or USERS ALL) let's you see who is on-line and send on-line messages by typing NOTIFY <*user name*> followed by the text. GEnie's message bases are structured differently from other networks; use command mode to get the most from them. GEnie also offers CB chatting and on-line gaming. Call by voice for details about on-line sign-up.

Mnematics (call 800/322-3633 voice, from New York state 914/365-0184) is a grassroots effort to personalize telecommunications. It offers an Amiga program library and message base along with some other very creative SIGs and services. The sign-up fee ranges from $15 to $40, depending on how you join, and connect rates are currently $3.49/hour through Tymnet during non-prime time up to 1200 baud. It's distinctly non-commercial, and the on-line graphics are quite interesting but visible only with Vidtex software—which is not yet available for the Amiga.

ProtoCall (call 800/826-3286 voice, from Virginia 703/359-9760) is based on a new philosophy—it's primarily a setting for live interaction. Structurally, the network is laid out like a city with streets, buildings and parks. You go to the post office, for instance, for electronic mail. You can chat publicly or in private with people in the same area and play interactive role-playing fantasy games ala Dungeons & Dragons or international spying. Automatons (artifically intelligent, system-generated personalities) randomly roam the system. Among the stores and buildings are some decidedly different but very popular SIGs (try Adult Trivia if you doubt it), including one for the Amiga with message bases and conference area. At this writing, they don't offer program transfers. Non-prime-time access is $3.60 at 300 baud, $4.80 at 1200 baud, and on-line sign-up is available.

The Source (800/336-3366, from Virginia 703/734-7500) is setting up a Commodore SIG that will be on-line by the time you read this. If SYSOP talent and experience is any indication (and it can be) the SIG could be a strong force, since this group came originally from the Commodore Information Network on CompuServe last year. They will have an Amiga section on-line. Non-prime-time rates for SIGs are lower than for the rest of The Source: $6 an hour at 300 baud, $7.80 at 1200 (as compared to $8.40 and $10.80, respectively). There's a $10 monthly minimum and membership is $49.95, which includes an extensive manual, but special SIG memberships at reduced rates may be available. The free on-line system tutorial is a big help in learning the ropes. Although not as extensive as CompuServe, The Source has much more to offer than SIGs.

The Well (call 415/332-4335 voice) is a Whole Earth Software Catalog enterprise operating on a Vax minicomputer running Unix BSD4.2. The Amiga Conference can be reached by typing G AMIGA at the : prompt (messages and program transfers) and the Amiga newsgroup on USENET can be accessed by typing !rn net.micro.amiga—however, you need to know more than space permits here to navigate it. Several methods of live one-to-one chatting are available. The Well is accessible through Uninet during non-prime time at 300 or 1200 baud for $5 an hour, or by dialing direct with your modem 415/332-6106 for $3 per hour. Both methods of access involve an $8 a month service charge.□

On-line Advice

Following are a few tips that could save you some time and aggravation in transferring files, connecting a modem to your Amiga, or attempting to debug a system that refuses to auto-redial. Many other questions or problems you may have can usually be answered by someone on the other end of the line. All you have to do is hook up!

Xmodem Protocol

There are hundreds of Amiga programs waiting to be downloaded from commercial networks and bulletin board systems (BBSs) for the mere price of connect-time. Unfortunately, they are not easy to get. If you get the message NOT AN OBJECT MODULE when you try to run a program that's been downloaded, you'll know what I mean.

Xmodem is an error-checking protocol that makes sure your computer received exactly what the other computer sent, and normally it works without a hitch. But the Amiga does something most computers don't: it checks for an end-of-file marker before running a program and gets a hitch in its get-along when it encounters the padding or extra characters that Xmodem adds after the EOF marker to fill out the final block of data to 128 bytes. Xmodem is used by almost all systems today and although this situation isn't terminal, it can cause discomfort.

Once a program has been transferred with Xmodem, the way to salvage it is to "strip" or "chop" it with an off-line utility that gets rid of the padding. Several of these utilities are available in the public domain, ChopX.MSB and FixObj to name a couple, but even if you don't mind the extra step of chopping after you download, it's messy because you must supply the correct number of bytes in a program, and that is easily lost or misinterpreted.

It's preferable—and in most cases feasible—to avoid the situation altogether. One way is to strip Xmodem padding as it is received, something a terminal program can do. No commercial program as of this writing does it because occasional groups of data in the middle of a program can be seen as padding (notably graphics), which would mean those programs couldn't be successfully downloaded. Commercial programmers are loathe to take that risk. There are, however, a couple of public domain programs that will "chop on the fly." One is StarTerm, which you can download, although it, too, (catch 22) must be chopped before it will run. But you can get it in ready-to-run form along with various utilities by sending $5 and a DSDD blank disk in a self-addressed mailer with return postage to either Scott Turner, 12311 Maplewood Ave., Edmonds, CA 98202-1115 or Steve Plegge, 230 River Bluff #307, St. Charles, MO 63301, both of whom are Delphi Amiga SYSOPs.

When transferring programs on CompuServe, padding can be avoided by using "B" protocol, which is supported by OnLine! from Micro-Systems Software. However, not only must you use it to download the program, it must have been used when the program was uploaded to CompuServe. Unless the file description says so, there's no way to tell until you've transferred it; if you get NOT AN OBJECT MODULE, it must be chopped.

Amiga Modem Cable

I've used several modems with the Amiga including Avatex 1200, Password 300/1200, CTS Datacomm 2424ADH and Novation Cat. All but the Password require a special Amiga cable—a standard RS-232, 25-pin cable should *not* be used as several of the connections can cause serious damage. If you can't find an

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◄ from remote areas will have to deal with long-distance, and then only to the nearest city with access lines.

Why Telecommute?

Besides computer-related topics, networks have areas dedicated to just about anything you can imagine—psychology and medicine, veterinary groups, comic books and literary forums, science fiction and working from home to name a few. The majority offer some form of live conversation, and, of course, electronic mail.

Professional financial databases and corporate histories are available on-line, as are weather and sports reports and extensive news from the Associated Press and major daily newspapers. There are complete encyclopedias and vertical market databases on-line that are wonderful resources for term papers and theses, not to mention professional research. Many of these reference services are surcharged. Since department stores and specialty shops abound, you can buy just about anything with your trusty credit card, 24 hours a day.

In fact, the fare is so varied and extensive, the only

Amiga cable, you can have one made using pins 1–8, 12, 20 and 22 *only*, and connecting 1 to 1, 2 to 2, etc.

1488 Transmit Line Driver

If you're having trouble redialing a number with your modem, which really means it isn't disconnecting properly, you could have a defective integrated circuit (IC) chip in your Amiga, the 1488 DTL quad line driver. After my Amiga had been on for a while, three of the four above modems refused to redial correctly. I suspected that they weren't at fault, but talking with Amiga service people, modem manufacturers and dozens of people on-line brought no solution. In fact, everyone seemed to operate those modems and others successfully, except me and a couple of other Amiga owners I stumbled across. (Since then, I've found quite a few.)

About the time I borrowed another Amiga (with which the modems worked fine), the solution arrived via BIX from an Amiga programmer in England. If you experience a similar problem, have your Amiga dealer check the length of time the voltage stays down on pin 20 when you send a disconnect signal. If it doesn't stay low for well over a second, replace the 1488 IC. It has a reputation for being unreliable in some circles, but it is inexpensive and readily available from electronic parts suppliers. Not coincidentally, this procedure has been approved by the Commodore Amiga Service Department.□

real problem you may face is in deciding which network to try first. All things considered, asking why you'd want to join a commercial network is like asking why you'd want to own a personal computer; it can be a tough question until you've found the answer, and by then you may wonder how you got along without it.■

Peggy Herrington specializes in the areas of microcomputers in music and telecommunications and is a Contributing Editor to AmigaWorld. *Write to her at 1032 Forrester St. NW, Albuquerque, NM 87012.*

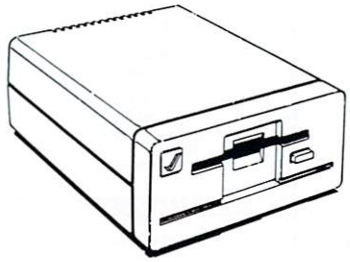
GO AMIGO!™

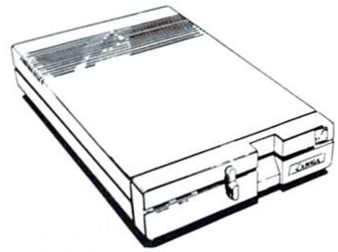
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Circle 26 on Reader Service card.

Color Printers

How well can you transfer Amiga color graphics to paper? Here's a comparative look at the merits and drawbacks of some dot-matrix, thermal-transfer and ink-jet color printers.

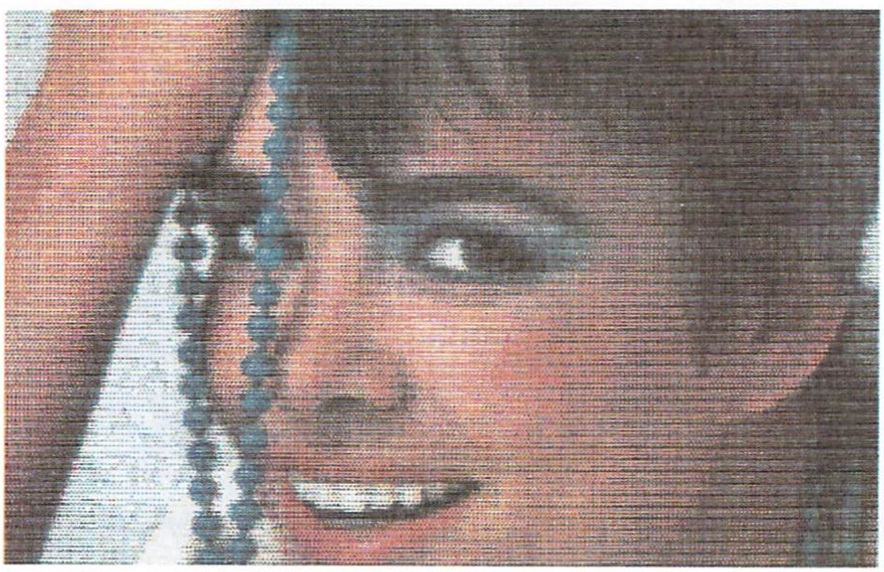
By Stan Kalisher

When I switched from a Macintosh to an Amiga, I received a lot of interesting comments from my former cronies because I left the fold. I even got a couple of condolence cards. But the comment I heard most often was "Yeah, those color graphics are nice, but how are you going to print them?"

I must admit that my first thought after purchasing my Amiga did not involve the printing of the color graphics. But just to quell those others, I decided to find out which color graphics printers would work with the Amiga, and, at the same time, do justice to its special graphics capabilities.

This comparison will focus on the graphics capabilities of the various printers. Unfortunately, the dichotomy between text and graphics is so great that being able to purchase one printer to accomplish both tasks very well is presently unrealistic. All of the printers I tested were purchased from normal channels, with the exception of the Okidata 292, which was not yet released at the time I was writing this article. However, a prototype was supplied to me by Okidata MidWest.

There are three basic types of color printers available for the Amiga, and all are supported in the Preferences printer menu in Workbench. The first and probably best-known type is the ribbon dot-matrix printer. These use a multicolored ribbon with four layers: red, blue, yellow and black. The ribbon moves up and down to allow the print head to strike the proper layer of ribbon to produce the desired color. Colors can also be combined to create new colors. A line of blue printed over a line of yellow yields a line of green, etc. A color's final shade is determined by a combination of varying densities of the four built-in colors. The printers tested here that use this method of color printing are the Epson JX-80, the Juki 5510-Color and the Apple Imagewriter II.



Epson JX-80, 12 minutes, 18 seconds; 63%

The second group of printers are thermal-transfer printers, which use ribbons coated with a waxy material that is actually melted and bonded to the paper. The ribbon is a single layer, but it's colored in sections: yellow, magenta and cyan. Between each section of three colors is a special sensor patch that tells the printer where each section of the colors starts. The Okimate 20 was the only thermal-transfer printer tested.

The third type is the ink-jet printer. Instead of using a ribbon, ink-jet printers actually spray a liquid ink onto the paper, which usually dries in less than half a second. The jet nozzles are arranged horizontally and each color is sprayed in the proper order to get the desired color on one pass of the print head. From this category I tested the Canon PJ-1080A and the Diablo C-150.

I used three different graphic files for my test. The first, entitled "The Girl," is a hold and modify (HAM) picture. HAM pictures are low resolution, 320 x 200, but are able to display all 4,096 colors at once and therefore are the most complex. The second, "Dream House," is a lo-res, 32-color IFF file similar to those used in Aegis Images, DeluxePaint and Graphicraft. It has a lot of shading and heavy detailing. The third is "Merlin," which was used to test the differences in the ribbon dot-matrix printers.

Ribbon Printers

The **Epson JX-80** ($399) is perhaps the best known of the color ribbon printers. A printer driver for it is provided in Preferences. The Epson uses a standard Amiga parallel cable and requires no special interface for the Amiga. The horizontal resolution is 72 dots per inch (DPI). Ribbons cost about $13 each, are readily available from most computer dealers, and can yield up to

50 color prints. The JX-80 uses normal paper, either tractor or friction feed.

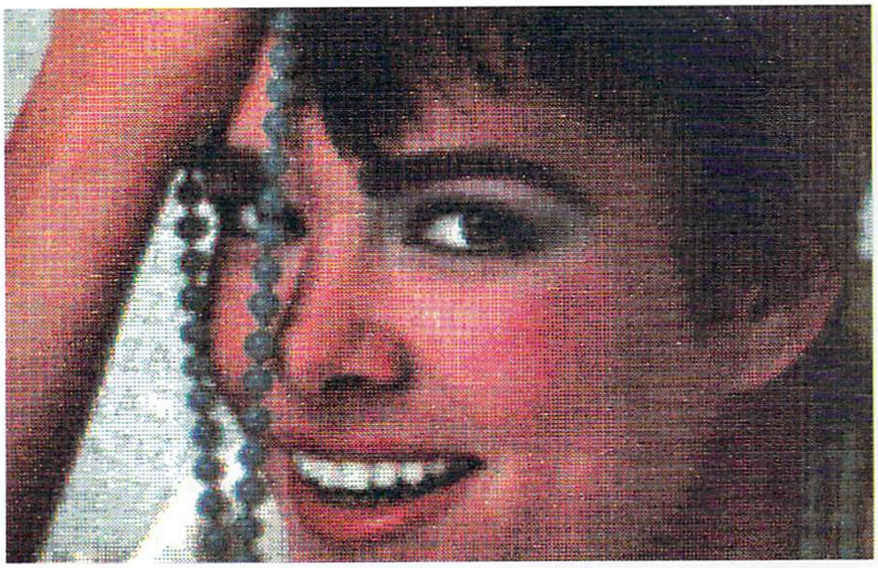
My main complaint with the JX-80 is its poor print quality. Because this printer was designed primarily for text, its color graphics are very flat and often flawed. There are always dark horizontal lines, and, because of the printing method used, the yellow layer of the ribbon tends to get smeared after the first several prints. This causes green horizontal stripes on large yellow areas. Since the resolution is only 72 DPI, you can really notice the dots on pictures that are not complex images. The problems of smearing and dots aren't as noticeable on pictures with more complex images such as "Dream House" and "The Girl," but the dark horizontal lines are very noticeable. In addition, the colors are quite flat, and printing time for the JX-80 isn't that great—12 minutes, 15 seconds. Although the JX-80 has been discontinued, it is still available in retail outlets and will be supported by Epson.

Both the **Juki 5510-Color** and the **Okidata 292** performed about the same as the JX-80, but they were about 50% faster. They are also more expensive: The Juki 5510-Color is $650 and the Okidata 292 is $595.

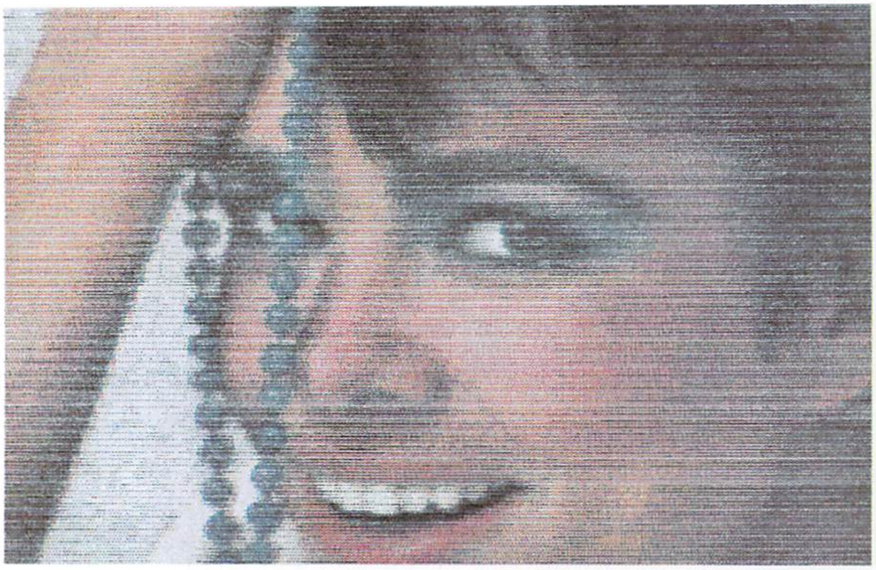
By far the best ribbon-type printer is Apple's **Imagewriter II** ($595). The Imagewriter uses the same ribbon technology as the others and also has similar operating and maintenance costs. The main difference is in print speed and color rendition. You can produce a print on the Imagewriter II in 5 minutes, 15 seconds, which is better than twice the speed of the JX-80. The Imagewriter can also produce 140 colors, compared to 107 for the others. This means that you will get a print that is closer to the screen colors than those from the other ribbon printers. The logic of the Imagewriter allows the head to skip around on each line, printing the darker areas before the lighter ones, but this excessive head movement usually causes some smearing due to the head rubbing on the paper before the ink is completely dry. Although the Imagewriter is not supported by Workbench 1.1 (but will be in 1.2), the driver and serial cable are available from Redmond Cable for $45.

Thermal Printer

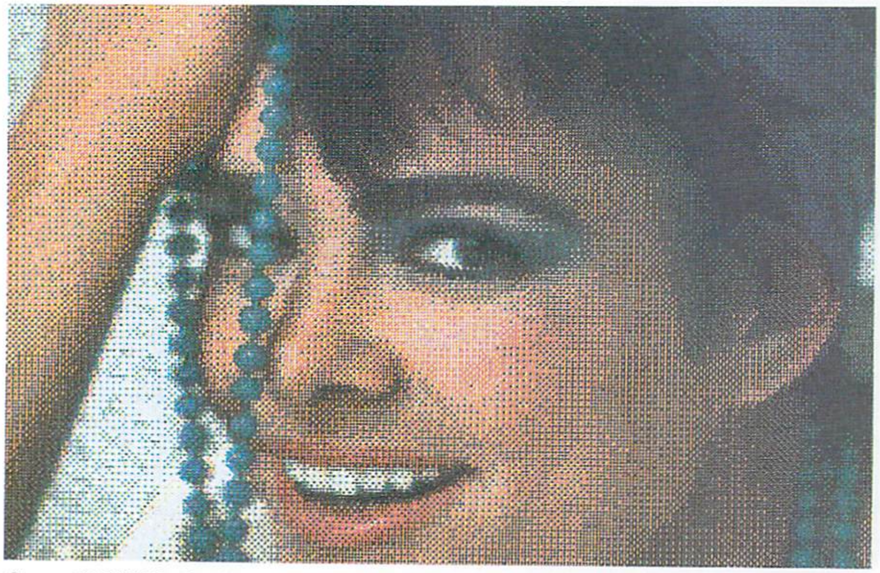
The only thermal-transfer printer I tested was the **Okimate 20** ($249 with Amiga interface). The Okimate 20 is supported by Workbench and a printer cable is ►



Diablo C-150, 6 minutes, 15 seconds; 63%



Apple Imagewriter II, 5 minutes, 15 seconds; 67%



Canon PJ 1080A, 3 minutes, 10 seconds; 71%

supplied with the interface. Despite the low initial cost of this printer, the operation costs become high if you do a lot of color printing.

To get the best results, this printer requires thermal-transfer paper, which is usually about $1 to $5 higher per 1,000 sheets than standard tractor-feed paper. The ribbons are the main expense, costing $5.95 and yielding only 13–15 prints each. The Okimate 20 produces high resolution (144 DPI) prints with very good detail. Because of the thermal-transfer technology, the colors are very bright and snappy. The only real complaints I have about the Okimate 20 are its printing time, which ranges from 13 to 16 minutes per picture, and the 1-pixel overlap of each line of printing, which causes dark horizontal lines on most prints. But considering the low price of the Okimate, you get a lot for your money.

Ink-Jet Printers

I was initially surprised and pleased to see the **Diablo C-150** ($1,295) printer driver in the Preferences menu. The C-150 has long been regarded as the premier ink-jet printer under $2,500. Best of all, it is the only printer that can reproduce all of the 4,096 colors available on the Amiga. It *had* to be the only color printer for the Amiga. Sound too good to be true? It was. Set-up and maintenance of the C-150 is a great task. As with all ink-jet printers, the C-150 requires a special clay-coated paper that allows the ink to dry fast. A roll of ink-jet paper costs about $13. Replacement ink cartridges cost about $10 for four, and this printer really uses a lot of ink. I've never gotten more than 20 to 25 pictures before having to replace one or more of the colors. You will also need to buy a special maintenance fluid designed to keep the jets clean and moist, but if for some reason you don't use this printer for more than two weeks, the jets tend to dry up and you have to do a partial "tear-down" to clean the thing.

The C-150 has a resolution of 144 DPI, but the logic of the printer causes it to suffer the same blight as the other much less expensive printers—horizontal lines. On simple pictures, you can't notice the lines very much because of the large areas of one color, but on more complex images, the horizontal lines are much more noticeable.

The C-150 also leans a great deal to the red end of the spectrum, which is demonstrated in "The Girl," and doesn't seem to deal with shades of blue very well. Details in the darker areas of pictures seem to lose their definition. Printing time for the C-150 is 6 minutes, 15 seconds per picture, somewhat slower than I expected. In all, this unit proved to be a great disappointment.

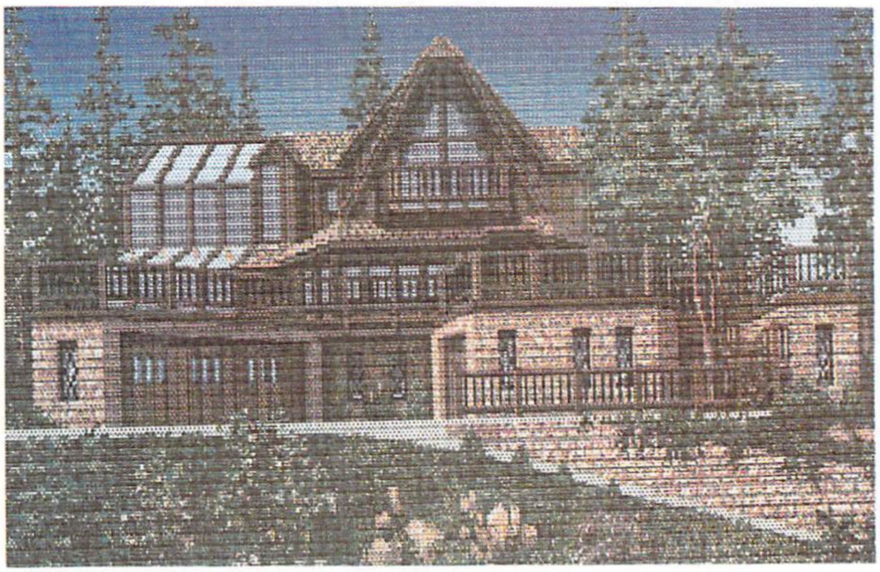
Perhaps the greatest surprise is the **Canon PJ-1080A** ($299). This printer has the same chassis used for the Quad Jet, the IBM color jet and the Tandy Ink Jet. These printers do have different ROMs than the Canon and vary in price from $495 to $695. The PJ-1080A is not being discontinued, but it is being de-emphasized by Canon/USA.

Like the Diablo C-150, this printer requires clay-coated paper, but it uses two special combination ink cartridges, one which contains only black, and another which contains the colored inks. Although these cartridges cost about $15 each, you will be able to print well over a hundred pictures before having to replace them. Like the Imagewriter II, the PJ-1080A requires a special printer driver (available from Tychon Technologies). The PJ-1080A uses a standard Amiga printer cable. Unlike the Diablo, the Canon does not need special set-up, cleaning or maintenance. Upon power-up, you simply have to press a small lever for 10 seconds to clean the ink jets. That's it!

Not only that, the Canon is *fast*. Maximum printing time is only 3 minutes, 15 seconds. I say maximum time because the Canon is the only printer I tested with true logic seeking. This means that if you have a lot of white space at the top or bottom of your picture, the Canon just line feeds until it needs to print a line of color. The Canon also interprets the Amiga colors better than the Diablo. Notice the flesh tones in "The Girl." The PJ-1080A also has a bold print switch that allows the



Okimate 20, 13 minutes; 67%



Epson JX-80, 12 minutes, 16 seconds; 67%

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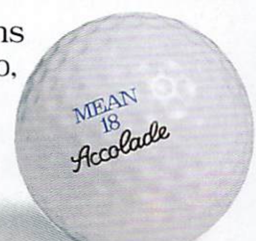
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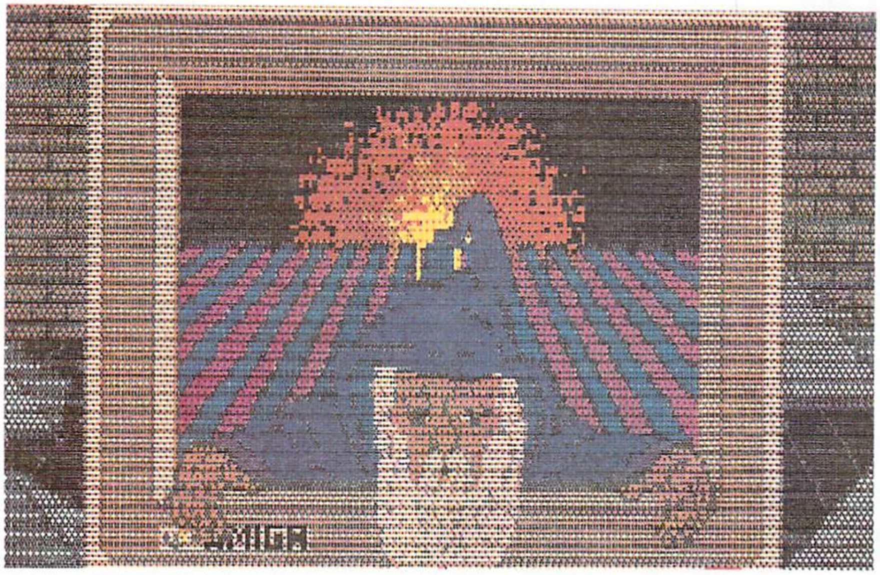
printer to double print each line for super-saturated colors. This increases the printing time to about four and a half minutes, but all in all, this one is a real winner.

Summary

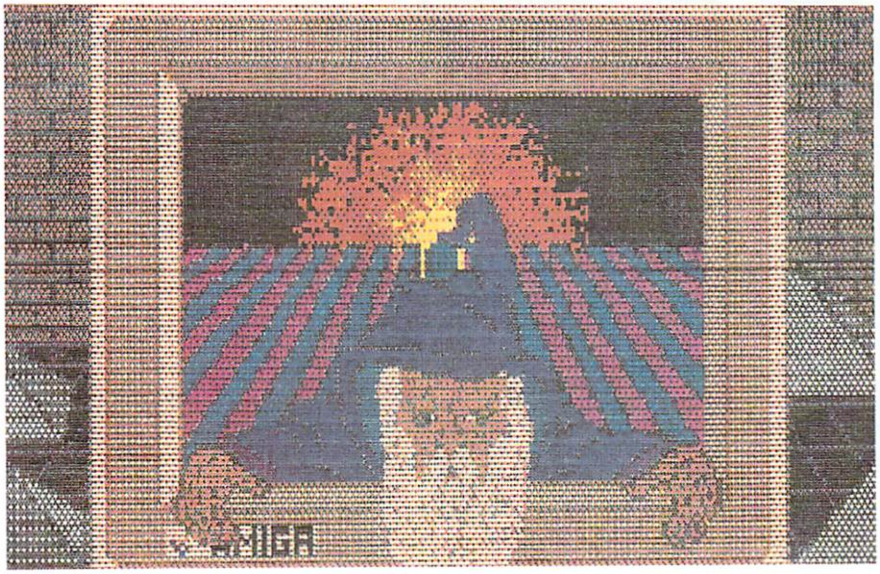
Judging from the new graphics emphasis in the computer industry, especially since the Amiga's release, I expect to see a great improvement in the price and quality of color printers. On the higher end, Seiko has a $7,000 thermal-transfer printer that is capable of directly reading the Amiga screen and producing a picture as large as 11 × 17 inches in about 40 seconds. The Seiko 5300 series can also support 4,900 colors and should fit well in an industrial or commercial environment. Xerox/Diablo has also just introduced the 4024 ink-jet printer, which is supposed to address the problems of the C-150, but its price of $1,500 means that it won't replace the C-150.

Hence, the bottom line: If you need to buy one printer for both text and graphics, get the Imagewriter II. If you can afford to have one printer for each application, buy the text printer of your choice and either the Okimate 20 or the Canon PJ-1080A.

Address all author correspondence to Stan Kalisher, 5313 Kentucky Ave. N, Minneapolis, MN 55428.



Juki 5510-Color; full size



Okidata 292; full size

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Apple Computer Inc.
20525 Mariani Ave.
Cupertino, CA 95014
408/996-1010

Canon PJ-1080A ($299)
Canon/USA
One Canon Plaza
Lake Success, NY 11042
516/488-6700

Epson JX-80 ($399)
Epson America Inc.
2780 Lomita Blvd.
Torrance, CA 90505
213/539-9140

Juki 5510-Color ($595)
Juki Office Machines Corp.
20437 S. Western Ave.
Torrance, CA 90501
800/325-6134

Okidata 292 ($595)
Okimate 20 ($249)
Okidata
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Mt. Laurel, NJ 08054
609/235-2600

Imagewriter II Driver/Cable ($45)
Redmond Cable
17371-A1 NE 67th Court
Redmond, WA 98052
206/882-2009

Canon PJ-1080A Printer Driver
Tychon Technologies Inc.
25000 Euclid Ave.
Euclid, OH 44117
216/261-7088

Diablo C-150 ($1,295)
Xerox/Diablo
PO Box 5030
Fremont, CA 94537
415/498-7317

C Compilers: Lattice vs. Manx

Choosing between Manx's Aztec C and Lattice C basically means deciding on the type of programming you will be doing.

By Mark L. Van Name and William B. Catchings

C has been associated with the Amiga ever since the computer was announced. Because software developers could purchase Amiga C along with their development systems and because a great deal of the Amiga's operating system and kernel support software was written in C, Amiga C quickly became the language of choice for most serious Amiga programming. Unlike the Amiga itself, however, Amiga C is not a brand-new product. It is instead a new version of an established and well-respected language: Lattice C. Until early 1986, Lattice C enjoyed a monopoly on the Amiga. But now there is competition: Manx's Aztec C.

In order to help you make a choice between these two language systems, we took a close look at both of them. As is typical, we also ran some benchmarks. Benchmarks cannot tell the whole story, however: a great deal of what each product has to offer does not manifest itself in simple timings. We will review each product and note its special strengths and weaknesses. Because Aztec C is newer and probably not as well understood, we will discuss it in a bit more detail. Then we will examine and discuss the results of the benchmarks. We end with a few suggestions as to how you might pick your Amiga C development system.

Manx Aztec C

Aztec C from Manx Software Systems is more than just a C compiler: it is a complete C software development environment. While it is a relatively new Amiga product, versions of Aztec C have been available on other computer systems for several years. Not surprisingly, the direct ancestor of the Amiga version is the one designed for the Apple Macintosh. As the new boy on the block, Aztec C must distinguish itself from Lattice if it is to gain any ground.

There are actually three different Aztec C compilers: the Personal, the Developer and the Commercial Systems. The Personal C system is the least expensive, but, according to Manx's advertisements, provides a minimal system. The Developer system offers an optimizing compiler, an assembler and a larger set of library routines. For the rest of this discussion and the benchmarks, we will deal with the Commercial system, the most powerful of the three. It adds to the Developer system more library routines, the source to these library routines, and a robust set of UNIX tools. The Commercial system is particularly interesting to C programmers who are accustomed to UNIX and its many software development tools. This version of Aztec C comes with a total "UNIX-like" software development environment. Included in this environment are the following: *grep*, a tool used to search for strings in files; *diff*, a utility that finds differences between files; *make*, a powerful development management tool; and *z*, a text editor that closely resembles UNIX's *vi*. These tools help to make the Aztec C Commercial version a very good environment for developing Amiga software. Manx also provides a symbolic debugger, *db*, in both the Commercial and the Developer versions. This could be a very important facility for those planning to develop complex Amiga applications. In the initial release of Aztec C that we reviewed (version 3.20a), *db* was not finished and had only minimal documentation. However, Manx claims that these problems will be fixed in the next version of the compiler.

Of course, application development tools are not very useful without a firm base. Aztec C provides that base with a complete implementation of C. Further, it performs well during both program compilation and execution. In our benchmarks, Aztec C compiled programs more quickly and produced smaller executables than Lattice C.

The attention to performance does not stop there. Aztec C gives you some options that, for many applications, will improve program execution performance dramatically. One of these options tells the compiler whether to make integers 16 or 32 bits long. The C language specification does not dictate which of these two sizes an integer must be. If your program does not need numbers less than $-32,768$ (negative 2^{15}) or ►

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greater than 32,767 (positive 2^{15}), using 16-bit integers can speed up your program and make it smaller. This occurs because 16-bit integers take less space and, therefore, can be retrieved from memory with fewer fetches than 32-bit integers.

By default, Aztec C gives you 16-bit integers and libraries designed to work with them. If you elect to use this integer size, be aware that all of the AmigaDOS and Amiga kernel routines assume 32-bit integers. To use them, you must either be sure to cast all integers to be 32 bits long or use the compiler switch that gives you 32-bit integers. By contrast, Lattice C only allows integers that are 32 bits long.

Another way in which Aztec C helps you improve the performance of your program is by allowing you to choose which *memory model* you want to use. You can choose either *large data* or *small data*, and either *large code* or *small code*. Basically, the small-data option limits the size of your global and static data to 64K, but often makes your code smaller and faster. The large-data option removes such limits, but at the possible expense of performance. Similarly, for all but very large programs, using the small code memory model tends to result in smaller and faster code. (The only absolute limit this imposes on you is that small code cannot reference data within a code segment more than 32K bytes away.) The Aztec C default is to use small data and small code, although you can instruct the compiler otherwise. The Aztec C libraries use this memory model.

Table 1. Program Execution Times (seconds).

Benchmark Program	Lattice C	Aztec C
fibonacci.c	27.20	22.74
float.c	28.86	3.30
pointer.c	16.88	19.96
sieve.c	5.94	6.04

Table 2. Program File Sizes (bytes).

Benchmark Program	Lattice C	Aztec C
fibonacci.c	16416	6476
float.c	16584	6512
pointer.c	16232	6332
sieve.c	24580	14684

Table 3. Compilation Times (minutes, seconds).

Benchmark Program	Lattice C	Aztec C
fibonacci.c	4:25	2:39
float.c	4:35	2:37
pointer.c	4:32	2:48
sieve.c	5:27	2:53

If you do much software development, then the time it takes your program to compile can become very important. As the benchmarks show, Aztec C tends to compile programs significantly faster than Lattice C. It also offers another option to help speed program compilation: you can *precompile* your include files. Most C programs include at least a few files at the beginning of every module. For large programs composed of many modules, the time spent repeatedly processing these include files can be large. If you use the precompile option on an include file, the compiler will do much less work processing that file in the future.

Manx's attention to performance manifests itself in another useful option. You can include, or *in-line*, assembler code in your C programs. Thus, in performance-critical sections, or when you need to access other routines written in assembler, you can put assembler code into your C routine. If you need to do only a few things in assembler, this can be simpler and easier than creating, assembling and linking a separate assembler module.

Unfortunately, every product, including Aztec C, has its shortcomings. Aztec C's biggest may be that it is a fairly new Amiga product. There are bound to be kinks to iron out and bugs to be found. Lattice C has already gone through its critical first six months and, consequently, has had many of its problems resolved. Since Aztec C for the Amiga is based on previous Manx versions for the Macintosh, the number of such problems should be minimized, but they can be expected to occur.

Aztec C also has a few limitations that may cause you problems if you are developing a large application. One such limit is that you may not open more than ten files or devices with C functions. You can work around this by opening the files through AmigaDOS. However, the restriction could make porting programs from another type of computer more difficult.

Another limitation is that the compiler has a fixed pool of memory from which it draws space for all of its pre-allocated tables. Thus, the tables for expressions, switch statements, local symbols, literals, macros and global symbols must all fit within this pool. You can adjust the size of any of these tables, but the total amount of space is fixed. When one table gets larger, another must become correspondingly smaller. For some large programs, adjusting these tables to get your program to compile could be either very frustrating or impossible.

Finally, you must consider the higher price of Aztec C. You can buy the Lattice C compiler and all of its development support utilities for a bit less than the Aztec C Commercial system. Also, other questions may arise. Do you need another editor, or is either of the two that AmigaDOS provides (ED and EDIT) adequate? Do you need a make facility, or are the simple compilation and linkage macros that Lattice supplies adequate? Only you can make this determination for your programming needs. Aztec C is more likely to be worth the higher price if you plan to be developing large applications. If you just want to write small programs while

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Lattice C

Lattice C is one of the old boys on the microcomputer block. Not only has Lattice C, as Amiga C, been available since the Amiga was introduced, it has been the most respected version of C on the IBM PC for years. Because it was the development language provided with the Amiga, the AmigaDOS and kernel routines were made to work with it. Finally, since it was introduced, Lattice has had time to fix a number of bugs and produce a solid product. This product maturity is one of Lattice C's greatest assets.

Although it does not bundle them with its compiler, Lattice also offers a number of program development tools. You can buy a *make* utility, an editor, and a group of text utilities. The text utilities include *grep* and *diff*, along with six other programs.

As well as utilities, Lattice offers libraries that may be very useful for program development. Among these are MacLibrary, which provides some compatibility with the Macintosh, and dBC III Library, which gives you dBase III capabilities. These libraries should work with Aztec C, as well as with Lattice.

The Lattice C compiler is a mature product with a wide range of options that can help you get the most from it. One particularly useful option lets you decide whether to use *stack checking*. Stack checking lets you know at any point in your program's execution whether you have allocated enough memory for the stack. It is especially useful while you are developing your program and determining what size stack it will require.

Lattice C also provides options that allow you to control such things as the type of memory model (as in Aztec C) and the character byte alignment. In addition, it offers a large array of features that let you take advantage of C language extensions and compatibility modes.

Lattice Inc.
22 West 600
Butterfield Road
Glen Ellyn, IL 60137
312/858-7950

C Compiler **$149.95**
Make Utility (LMK) **$125**
Text Utilities **$75**
Screen Editor **$100**

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Shrewsbury, NJ 07701
201/780-4004

Aztec C68K/Am-c (Commercial) **$499**
/Am-d (Developer) **$299**
/Am-p (Personal).........................**$199**

The price nod definitely goes to Lattice. The complete compiler costs less than Manx's Personal C system. If you need other particular tools, you can purchase them separately. The price of all of these utilities plus the compiler totals $449.95 and is still less than the comparable Aztec C Commercial system. Given how many purchase decisions are based on price alone, this is a significant advantage.

The main disadvantage of Lattice C is its compilation performance. As the benchmarks show, it tends to compile slower and generate larger routines than Aztec C. These disadvantages could be particularly painful during large program development.

Benchmarks

We ran four benchmark programs on a 512K Amiga with two disk drives. Since any serious application development requires at least two disk drives, we did not try to compile any of the benchmarks on a single-drive system. Also, we did not put any of the programs into RAM:. We tried to use the simplest compilation and linking procedures available.

Three of the four programs were designed to test the speed of specific language features. We included the fourth, sieve.c, because it is a popular benchmark that can be used for comparisons with other machines. Briefly, the following are the four benchmark programs and their purposes:

fibonacci.c computes a Fibonacci series recursively. This is used to test the performance of function calls.

float.c performs a simple floating point calculation many times. Since floating point operations are handled by software, it is important to test them.

pointer.c repeatedly cycles through an array using pointers to test pointer manipulation.

sieve.c is the Sieve of Eratosthenes; computes the primes between 1 and 8190. A "classic" general benchmark.

For each program and compiler, we noted the time it took to compile and link, the execution time, and the size of the resulting executable file. We timed the compilations with a stopwatch, counting from when the compile command was terminated by a RETURN to when the CLI prompt reappeared after the linking was done. All four programs timed their own executions. This was done by including two files, startup.c and done.c, around the active code of each. These two files check the time by using the AmigaDOS function DateStamp, and then compute the elapsed time. We used the LIST command to get the size of the executable files.

We used Lattice C 3.03 and the Commercial version of Manx's Aztec C68K 3.20a for the benchmarks. For Lattice compilation and linkage, we used the macro *makesimple* that comes with the package. In the first installment of this tutorial, we suggested that you program using two disks (C-CLI and C-DEVEL). We followed that procedure and then put the *makesimple* macro in with the other commands.

The Manx *make* facility is a great deal more complex and probably unfairly slow. Therefore, we made a *makesimple* for Manx that was equivalent to the one supplied by Lattice and used the same AmigaDOS commands. ►

Because we wanted to compare the two compilers as closely as possible, we changed the Aztec C defaults substantially. We chose large code and large data, and we forced all integers to be 32 bits and linked with the appropriate libraries. This did not exploit the full power of Aztec C, but it did make the two compilations more similar.

The results of the benchmarks are shown in Tables 1, 2, and 3. There are a few obvious trends. First, Aztec C always compiled and linked significantly faster than Lattice C. On average it took about 60% of the time taken by the Lattice compiler. Both the compilation and linkage stages were faster with Aztec C, although we show exact times only for the complete process.

The code generated by Aztec C also was dramatically smaller than that produced by Lattice. The message from these two sets of numbers seems clear: Aztec C provides much quicker and more efficient compilation and linkage.

We should point out that Lattice C uses the standard Amiga linker, *alink*, for its linkage phase. Also, it produces objects in the standard Amiga format. Aztec C uses its own linker and produces objects in its own format. This means that you cannot link anything with an Aztec C program that was not produced by the Aztec C compiler or assembler. While not a great drawback, this could cause trouble if you ever need to link with non-Manx libraries.

We did, however, find one unfair advantage that Aztec C had over Lattice C: through the use of an environment variable set in its startup-sequence file, it put into RAM: the temporary file created by the compiler and passed to the assembler. However, in keeping with our goal of using the "off-the-shelf" compilation techniques as much as possible, we did not change this. But Aztec C was at a slight disadvantage because the two libraries with which we linked could not fit on the main disk and so were on the same disk as the object file.

While Aztec C clearly won on the compilation-and-linkage process, the execution times showed mixed results. The two were about equal on the sieve program, the Lattice pointer executable file was about 15% faster, and the Aztec fibonacci file won by about 25%. But at least all of these were close. When it came to the floating point test, Aztec C beat Lattice by a factor of nearly 7.

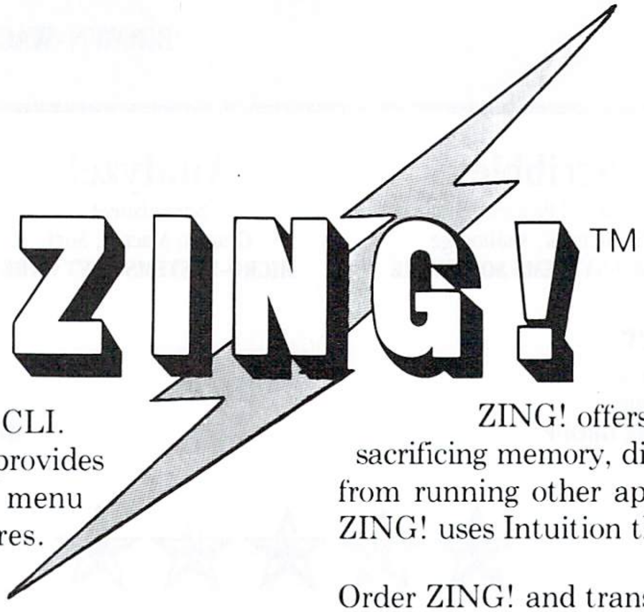
The Verdict

Manx's Aztec C is significantly more expensive and, as the newer product, is likely to be more prone to problems. However, it offers a much faster development environment and the opportunity, through its smaller integers, for faster executables. Lattice C is a solid product with plenty of well-tested options, but it is not as fast a development system. If you are cost-conscious or plan to develop only relatively small programs, Lattice C is probably for you. If you have the money and will be developing large systems, Aztec C may be the better choice. Amiga programmers are fortunate to have two excellent C development systems available to them. ■

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The format we chose is simple. Where the chart says a product is available *Now*, it means it had been released when this information was compiled (Summer); beyond that we decided to be no more specific than *Summer*, *Fall* or *Late 86*. Products announced for release after 1986 were not included.

An asterisk (*) means 512K is required; a plus sign (+) means a second disk drive is necessary. Question marks remain where questions of price remained. Where specifically claimed, IFF compatibility was marked. (Sometimes, however, the absence of these indications could simply mean we were unable to get definite information. Double-check *all* requirements before buying *any* product.) Prices and on-sale times were put where it seemed most convenient. A single-column format was used for a few companies that have numerous products. Categorizing is always a bit confusing; you'll notice that the Personal, Productivity and Business sections overlap product-wise. (The only thing clear about the definition of Productivity is that it's unclear. One could say crashing a non-backed-up copy-protected disk is the antithesis of productivity.)

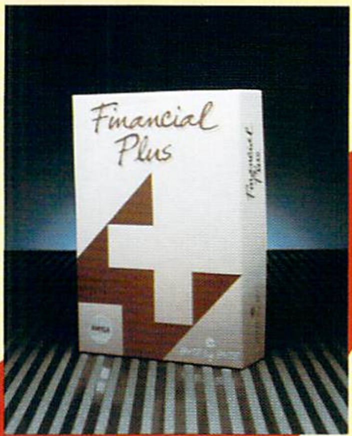
Products with longer descriptions were not given more space because we felt they deserved more; we went with the information at hand. And some products simply need more explanation. If you're interested in any of the products, you should find out more about them through the companies listed or a dealer.

So. The next time someone tells you the Amiga "...just doesn't have any decent software," take out this magazine and, after rolling it up with a menacing look, show them this chart.

Photographed by Larry Dunn

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Ensign Software **Commodity Futures Real-time Tic Chart** $795/ Late 86	Tic by tic futures information software; for Bonneville Telecommunications satellite data stream service and Market Monitor satellite data decoder
Lionheart Business Software **Business Statistics**, $145; **Decision Analysis Techniques**, $110; **Experimental Statistics**, $145; **Explanatory Data Analysis**, $75; **Forecasting and Time Series**, $145; **Linear and Non-linear Programming**, $95; **Multi-variate Analysis**, $145; **Optimization**, $110; **Pert and Critical Path Techniques**, $95; **Quality Control and Industrial Experiments**, $145; **Sales and Market Forecasting**, $145 All available Now	
The Other Guy's **KEEP-Trak** $299.95/ Now	General ledger, accounts payable-receivable, payroll (also available separately)
Softwood Co. **MiAmiga Ledger** $99.95/ Summer	Double-entry general ledger accounting system, balance sheet, income statements, customized reports, charts/ *



Databases

Company/ Product(s) Price/ On Sale	Description
Digital Solutions **LPD Filer** $75-$150/ Fall	Multiple DBs, can be integrated with other 2 LPD products/ *
Harvsoft **Info Base** $45/ Now	200-field records, custom print forms, runs under Amiga Basic/ *
Megasoft **A Filer/ A Report** $59.95/ Fall	12-field records, disk file creation, selective printouts, create reports or mailing labels from data files
Micro-Systems Software **Organize!** $99.95/ Fall	128-field records, menus-keyboard, form definition, mail merge with *Scribble!* / *
The Other Guy's **Omega File** $79.95/ Now	256-field records, menus-keyboard, full-screen editing, mail merge, menu Preferences access, search, sort/ *
Softwood Co. **MiAmiga File** $99.95/ Now	32-field records, 32,000 records per file, select by example-range, horizontal/vertical scrolling, 8 field types/ *
Transtime Technologies **Datamat A-200** $249.95/ Summer	Relational DB, identical user interface across hardware-OSs (AmigaDOS, MS-DOS, UNIX, XENIX, VMS, others), data dictionary, voice, form creation, simple statistics, simple word processor, mass editing, dictionary, queueing, interface for external word processors, tutorial creation/ * +
Datamat A-300 $349.95/ Summer	Above plus: statistical functions (regression analysis), graphics creation-output/ * +
Datamat A-100 $125/ Fall	Lower-powered version with more developed Intuition interface
Datamat EBU $40/ Summer	Executable batch utilities
RTD $95/ Summer	*Runtime Datamat*
VersaSoft **dBMan** $149.95/ Summer	Relational, dBase compatible, 128-field records, 2 billion-record files, 10 active files, run-time package available ($149 extra)/ *

Educational

Company/ Product(s)	Description/ Price/ On Sale
Associated Computer Services **Grade Manager**	Gradebook-statistics, 100-point scale conversion, attendance, reports, SCAN-TRON optical interface, $89.95, Summer

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A

Absoft Corp.
4268 N. Woodward
Royal Oak, MI 48072
313/549-7111

Access Software
2561 S. 1560 W.
Woods Cross, UT 84087
801/298-9077

Accolade
20823 Stevens Creek Blvd., C-1A
Cupertino, CA 95014
408/446-5757

Activision
2350 Bayshore Frontage Road
Mountain View, CA 94043
415/960-0410

Aegis Development
2210 Wilshire Blvd.
Santa Monica, CA 94043
213/306-0735

Alive Systems Group
PO Box 50
Big Sur, CA 93920
415/332-8018

Amiga Man
PO Box 58768
Houston, TX 77258
713/480-1735

Associated Computer Services
839 S. Glenstone
Springfield, MO 65802
417/865-6555

B

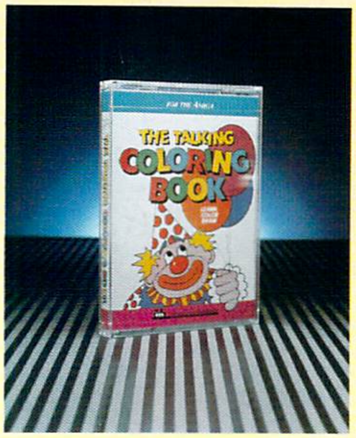
Batteries Included
30 Mural St.
Richmond Hill, Ontario
Canada L4B 1B5
416/881-9941

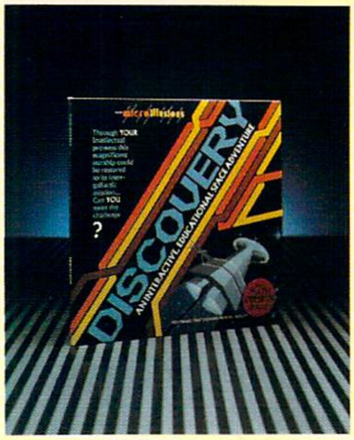
Baudville
1001 Medical Park Drive SE
Grand Rapids, MI 49506
616/957-3036

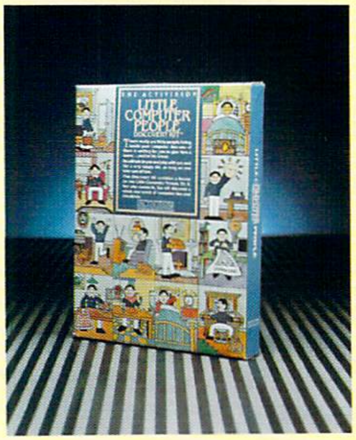
B.E.S.T. Inc.
PO Box 852
McMinnville, OR 97128
503/472-9512

Bethesda Softworks
9208 Burning Tree Road
Bethesda, MD 20817
301/469-7061









Paraclete	Music tutorials, sight-ear training, individual pace, $89.95, Summer
Quiz Master	Create-design and give tests-quizzes, grading, scoring, progress reports, $79.95, Summer; 2 support disks ($49.95) for teaching music also: Music Student I and II
CBS Interactive Learning	
Mastering the SAT	2 full-length SAT exams, hundreds of exercises, student notebook, $99.95, Now (with Teacher's Notes, $109.95; lab pack, $329.95)
Eclipse Data Management	
KWIK-SPEAK I	Spanish tutorial, speech, approx. $50, Summer
Finally Software	
Señor Tutor	Verbal Spanish tutorial, $49.95, Fall
First Byte	
Kidtalk	Talking word processor, "Smooth-Talker" speech, reading-writing, graphics, menus-icons, $59.95, Now
Speller Bee	Talking spelling program, graphics "type and talk," $59.95, Now
JMH Software of Minnesota	
Talking Coloring Book	Color recognition with speech, children's graphics: coloring-drawing, $29.95, Now
MicroEd Inc	
(All use Amiga voice)	
Basic Grammar	$29.95, Now/ *
Beginning Reading Series	1, 2, 3, 4; $29.95ea, Now/ *
Capitalization	$29.95, Now/ *
Elem. Social Studies Vocabulary	$29.95, Now/ *
High-level Vocabulary	$49.95, Now/ *
Point	Color-shape-word identification, $29.95, Now
Punctuation	$29.95, Now/ *
Spelling Detective Game	Commonly misspelled words, $39.95, Now/ *
Spelling Series	Levels 2, 3, 4, 5, 6, $29.95ea, Now/ *
Word Demons	Problem homonyms, $29.95, Now/ *
History Lessons:	
Across the Plains	With digitized photos, 2 disks, $59.95, Now/ *
Great Lakes Fur Trade	Digitized photos, 3 disks, book, $79.95, Now/ *
Lewis & Clark Expedition	Digitized photos, 5 disks, $89.95, Now/ *
Making Our Constitution	Digitized photos, 4 disks, $79.95, Now/ *
MicroIllusions	
Discovery-Spelling	Interactive-educational adventures, music, 3-D
Discovery-Math	animated characters-scenes, $39.95ea, Now/ *
Mindscape	
The Halley Project	Astronomy, space simulation, $44.95, Now
Keyboard Cadet	Typing tutor, QWERTY or Dvorak, $39.95, Now
MasterType	Typing tutor, 18 lessons, $39.95, Now/ *
The Perfect Score	Prepare for SATs, $79.95, Fall
The Other Guy's	
Great States U.S.A. $39.95/ Now	(Elementary), States, capitals, identification and information
Spell-man, Add-man $39.94ea/ Fall	(Elementary), Spelling and addition programs

True BASIC Inc.	
Algebra	$49.95, Summer
Calculus	$49.95, Summer
Chipendale	Statistical Analysis, $49.95, Summer
Probability	$49.95, Summer
Discrete Math	$49.95, Summer
Pre-Calculus	$49.95, Summer
Trigonometry	$49.95, Summer
True Stat	Statistics, $79.95, Summer
Queue	
Intellectual Software	
Analogies	1 and 2, $65ea, Now
Comprehensive Grammar	1 and 2, $54.95ea, Now
French Grammar	$34.95, Now
Geography Adventures	U.S.; World: 1, 2, 3, 4, $59.95ea, Now
History Adventures	American History Adventure; World History Adventure, $59.95ea, Now
How to Spell	$39.95, Now
How A Bill Becomes A Law	$59.95, Now
Lessons in Reading and Reasoning	$149.95, Now
Practical Sentence and Word Composition Series:	
1. **Making Words Work**	$44.95, Now
2. **Clear Sentences**	$54.95, Now
3. **The Best Approach**	$44.95, Now
4. **Making Sentences Work**	$44.95, Now
5. **Using Words Correctly**	$44.95, Now
College Aptitude Reading Comprehension Exercises:	
Reading Adventures	1, $39.95; 2, 3, $59.95ea, Now
Reading and Thinking	1, 2, 3, $54.95, Now
Spanish Grammar	$34.95, Now
Starting a Business	Business start-up simulation, $59.95, Now
Vocabulary:	
Antonyms	$34.95, Now
Practical Vocabulary	$54.95, Now
Vocabulary Adventures	1, 2, 3, $59.95ea, Now
Scientific Software	
Equation Plotter	Equation plotting, equation library, graphics root display, Amiga Basic, $29.95, Now/ *

Games/ Entertainment

Company/ Product(s)	Description/ Price/ On Sale
Access Software	
Leaderboard Golf	Graphics golf simulation, $39.95, Summer
Accolade	
Mean 18	Graphics golf simulation, $44.95, Fall
Activision	
Borrowed Time	Illustrated text adventure, detective-murder mystery, $44.95, Now

Brown-Wagh Associates
16795 Lark Ave. #210
Los Gatos, CA 95030
408/395-3838

Byte by Byte
3736 Bee Cave Road, Suite 3
Austin, TX 78746
512/328-2983

C

Capilano Computer Systems
PO Box 86971
N. Vancouver, BC
Canada V7L 4P6
604/669-6343

CBS Interactive Learning
1 Faucett Place
Greenwich, CT 06836
203/622-2500

Chang Labs
5300 Stevens Creek Road
San Jose, CA 95129
408/246-8020

Classic Image
510 Rhode Island Ave.
Cherry Hill, NJ 08002
609/667-2526

Clockwork Computers Inc.
2215 Sarah Court, Suite 80
Norcross, GA 30093
404/851-9103

Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380
215/431-9100

Compumed
PO Box 6939
Salinas, CA 93912
408/758-2436

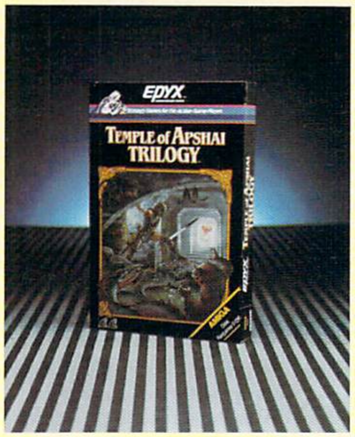
The Computer Club
4843A S. 28th St.
Arlington, VA 22206
703/998-7588

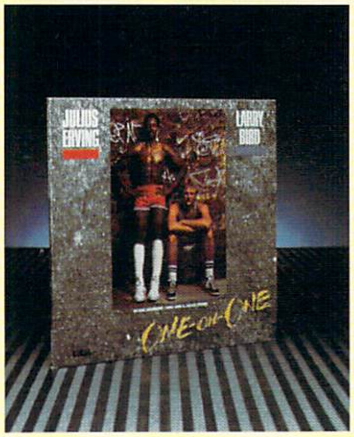
Computer Food
2215 Sarah Court, Suite 80H
Norcross, GA 30093
404/851-9103

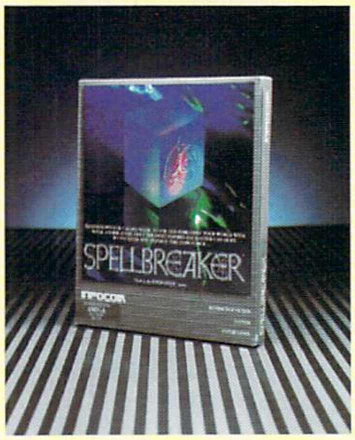
Computer Solutions
PO Box 354
888 S. Eifert
Mason, MI 48854
800/874-9375

Creative Solutions
4701 Randolph Road, Suite 12
Rockville, MD 20852
301/984-0262









Hacker	Illustrated text, hacking, international intrigue, $44.95, Now
Hacker 2	Hacker continued, $49.95, Summer
Mindshadow	Illustrated text, travel, mystery, $44.95, Now
Little Computer People Discovery Kit	Interactive "doll house," animated characters, music-games, $49.95, Now/ *
GameMaker	Design computer games, art, animation, sound-music, $59.95, Fall/ *
GameMaker Libraries	Sports or Science Fiction; pre-made scenes-features, $34.95ea, Fall
Portal	Illustrated science fiction novel, $?, Late 86/ *
Tass Times in Tonetown	Illustrated fantasy adventure, music, $44.95, Fall/ *
Shanghai	Chinese strategy game Mah Jongg, 1 or more players, $44.95, Fall/ *

Amiga Man

Shifting Sands	Graphics, sound strategy, $29.95, Now/ *
Space Adventure	Various space games, $39.95, Now/ *
Fun and Games	Assorted games, $39.95, Now/ *

Baudville

Video Vegas	Casino games: Blackjack, Draw Poker, Slots, Keno, graphics $34.95, Late 86

Bethesda Softworks

Gridiron	Real-time football simulation, $69.95, Fall 86/ *

Classic Image

Diablo	Strategy-arcade, maze: moving ball-panels-tracks, $29.95, Summer/ *

Commodore

Mindwalker	Graphics adventure, strategy, action, animated characters, sound, $49.95, Now

Computer Solutions

Strategy and Adventure	3 disks: Strategy 1 and 2 (puzzles), Adventure 1 (4 text adventures), $11.95ea, Now

Dark Horse

Chessmate	Chess, 2-D or 3-D display, multiple skill levels, speech, move list, Amiga Basic, $32.50, Now/ *

Electronic Arts

Adventure Construction Set	Graphics adventure creation: creatures, sound-music, special effects, $39.95, Now
Archon	Chess-fantasy, strategy, $39.95, Now
Archon II: Adept	Sequel, more magic-strategy, $49.95, Now
Arctic Fox	3-D tank simulation, battle, $39.95, Now
The Bard's Tale	Fantasy role playing, $?, Late 86
Chessmaster 2000	Expert-level chess program, $44.95, Fall
Dr. J and Larry Bird Go One on One	Action basketball, sound, $39.95, Now
Marble Madness	Arcade-strategy, animation, sound, $39.95, Now
Seven Cities of Gold	Graphics adventure, exploring, $39.95, Now
Skyfox	Flight simulation, battle, $39.95, Now
Software Golden Oldies	Pong, Eliza, Life, Adventure, $34.95, Now

Epyx

Rogue **Temple of Apshai Trilogy**	Strategy-action maze adventures, many characters-levels-rooms, $39.95ea, Now/ *

Finally Software

Dr. Xes	"AI" therapy session, speech, $49.95, Summer

Firebird Software

The Pawn	Illustrated text fantasy-adventure, $44.95, Fall

Gamestar (Division of Activision)
Graphics simulations

Championship Baseball	Up to bat or on the field, $44.95, Fall/ *
Championship Golf	Vol 1: Pebble Beach, $44.95, Fall/ *
GBA Champ. Basketball	2 on 2, 23-team league, $44.95, Fall/ *

Geodesic Publications

Triclops Invasion	3-D space game, fractal earth, animated characters, battle, $21, Now

Infocom (Division of Activision)
Non-illustrated Text Adventures
Science Fiction, Mystery, Adventure
(I = introductory, S = standard, A = advanced, E = expert)
Ballyhoo (S,mys) $49.95; **Cutthroats** (S,adv) $39.95; **Deadline** (E,mys) $49.95; **Enchanter** (S,fan) $39.95; **Hitchhiker's Guide to the Galaxy** (S,sci-fi) $39.95; **Infidel** (A,adv) $44.95; **A Mind Forever Voyaging** (A,sci-fi) $44.95; **Planetfall** (S,sci-fi) $39.95; **Seastalker** (I,adv) $39.95; **Sorcerer** (A,fan) $44.99; **Spellbreaker** (E,fan) $49.95; **Starcross** (E,sci-fi) $49.95; **Suspect** (A,mys) $44.95; **Suspended** (E,sci-fi) $49.95; **Wishbringer** (I,fan) $39.95; **The Witness** (S,mys) $39.95; **Zork I** (S,fan) $39.95, **Zork II** and **III** (A,fan) $44.95ea; all above available Now

INSIGHT/ Lehner Communications

Financial Time Machine	Simulation of real investment world from 1930-1984, economic strategy, $39.95, Now

Jenday Software

Conversation with a Computer	Conversation, games, includes Basic code, $29.50, Now

Mark of the Unicorn

Hex	Fantasy, graphics, strategy, $39.95, Now

Master Designer Software

Cinemaware Series	*"Interactive movie" adventures, 3-D animation, fancy graphics, music, battle, romance*
Defender of the Crown	Knights, maidens, jousts, swordfights/ *
The King of Chicago	1930's gangster story, mob war/ *
S-D-I	Future scenario, flight simulation, space combat/ *
Sinbad and the Throne of the Falcon	Pirates, genies, swordfights, monsters/ * $?, All above: Fall–Late 86

Megatronics

Talking Trivia	2,000 trivia questions, add your own, $19.95, Now

Meridian Software

Games Gallery 1, 2, 3	15 classic games per disk, $29.95ea, Now

MicroIllusions

The Faery Tale	Animated fantasy-adventure, $39.95, Late 86/ *

Micro Prose

Gunship	Fighter helicopter simulation, $39.95, Late 86/ *

Mindscape

Balance of Power	Geopolitics simulation, graphics, $49.95, Fall

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Crystal Rose Software
109 S. Los Robles
Pasadena, CA 91101
818/795-6664

D

Dark Horse
Dept. A9, Box 36162
Greensboro, NC 27416
919/852-3698

Data Research Processing Inc.
5121 Audrey Drive
Huntington Beach, CA 92649
714/840-7186

Delta Research
9054 Wilkie Way
Palo Alto, CA 94306
415/856-3669

DeluxeHelp Inc.
Box 249, 4356 Okeechobee Blvd.
West Palm Beach, FL 33409
305/622-0138

Desktop A.I.
1720 Post Road E.
Westport, CT 06880
203/255-3400

Digital Creations Inc.
530 Bercut Dr., Suite F
Sacramento, CA 95814
916/446-4825

Digital Solutions Inc.
30 Wertheim Court, #2
Richmond Hill, Ontario
Canada L4B 1B9
416/731-8775

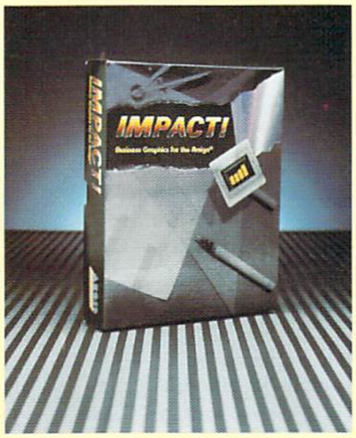
Discovery Software
262 S. 15 St., Suite 300
Philadelphia, PA 19102
215/546-1533

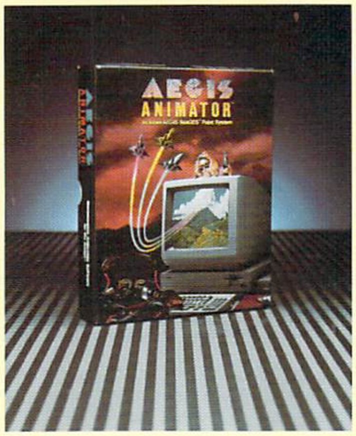
The Dragon Group
148 Poca Fork Road
Elkview, WV 25071
304/965-5517

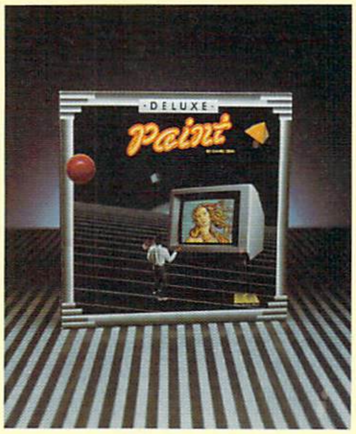
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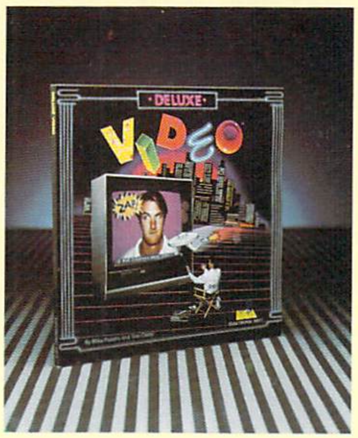
Eclipse Data Management
312½ Lafayette St.
Glendale, CA 91205
818/956-0766

Eight Stars Software Inc.
2900 Boniface Pkwy.
Anchorage, AK 99504
907/338-1246









Brataccas	Animated interactive adventure, $49.95, Now/ *
Deja Vu	Illus. text adventure, murder mystery, $49.95, Fall
The Halley Project	Space simulation adventure, $44.95, Now
Racter	Bizarre "AI" conversation, $44.95, Now
Origin Systems	
Strategy-adventure, graphics	
Autoduel	Futuristic, car battles, $?, Late 86
Ultima III	*"Exodus,"* Fantasy adventure, $59.95, Fall
The Other Valley Software	
Monkey Business	Hi-res arcade, $24.95, Now/ *
Polarware	
COMPREHEND Illustrated novels	
The Crimson Crown	Fantasy-horror, $29.95, Summer/ *
The Coveted Mirror	Fantasy, magic, $29.95, Fall/ *
Oo-Topos	Sci-fi adventure, $29.95, Summer/ *
Transylvania	Fantasy-horror, $29.95, Summer/ *
Sierra On-Line Inc.	
Illustrated stories	
The Black Cauldron	Disney fantasy-adventure story, $39.95, Late 86
King's Quest I, II, III	Fantasy adventures, $49.95ea , Late 86
Strategic Simulations	
Computer Baseball	Action baseball simulation, $39.95, Summer/ *
subLOGIC	
Flight Simulator 2	Detailed 3-D flight simulation, $49.95, Fall/ *
Jet	Fighter-pilot simulation, $49.95, Fall/ *

Graphics/ Animation

Company/ Product(s) **Price/ On sale**	**Description**
Aegis Development	
Aegis Animator	Metamorphic animation/ * IFF
$139.95/ Now	Includes Images paint program
Aegis Art Pak #1	Clip art by Jim Sachs/ IFF
Aegis Art Pak #2	Clip art by Tom Nelson/ IFF
$34.95ea/ Summer 86	
Aegis Images	Paint program, lo-med res/ * IFF
$79.95/ Now	
Aegis Impact	Business presentation graphics production/ * IFF
$199.95/ Fall 86	
Batteries Included	
Degas Elite	Paint program, multiple screens/ *
$79.95/ Late 86	
Commodore	
Graphicraft	Paint program, lo res/ IFF
$49.95/ Now	
Crystal Rose Software	
Analytic Art	Mathematically-produced color drawings/ IFF
$59.95/ Fall	

DeluxeHelp Inc.
DeluxeHelp for DeluxePaint — Runs with DeluxePaint, on-line help on all DPaint features and uses
$19.95/ Now

The Dragon Group
Amiga Coloring Books — Clip art, 3 volumes: Sampler–various; The World–maps; Borders–assorted picture borders
$34.95ea/ Summer

Discovery Software
Grabbit — Screen dump program, save-print any screen, background operation, HAM, IFF
$29.95/ Summer

Electronic Arts
DeluxePaint — Paint program, lo-med-hi res/ IFF
$99.95/ Now
DPaint Art/Utility Disk — Artwork, slideshow, brushes, print spooler, polyscope/ IFF
$29.95/ Now
DeluxeVideo — Cel animation with stereo sound, 3-D movable text/ * IFF
$99.95/ Now
New Tech. Coloring Book — "Color-by-number" software, IFF
$19.95/ Fall

JDK Images
PRO VIDEO CG I — Video production, hi-res character-generator features, text, animated page transitions/ *
$1500–$2000/ Fall

Revolution Software
BobShop/ Soundshop — Blitter Object and animation editor, music program also
$49.95/ Now

Zoxso
Imagine This — Digitized image processing, also usable with non-digitized IFF files/ *
$?/ Late 86

Graphics/ Special Applications

Company/ Product(s) Price/ On Sale	Description
Aegis Development **Aegis Draw** $199.95/ Now	2-D CAD, multi-zoom, windows/ * + IFF
Associated Computer Services **Station Manager** $1995/ Late 86	TV station management package, with hi-res weather maps/ * IFF
Weather Graphics $995/ Now	Hi-res graphics weather maps for TV use/ IFF
Brown-Wagh Associates **Zuma TV TXT** $249.95/ Fall 86	Hi-res professional animated video text production/ * +
Zuma Fonts (vols 1, 2, 3) $34.95ea/ Summer 86	High-quality fonts (3 per vol.), font library utility
Capilano Computer Systems **LogicWorks** $199.95/ Summer 86	CAD: Integrated logic design, schematics, simulation/ *

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Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
415/571-7171

Emusoft Corp.
1400 Chicago Ave.
Evanston, IL 60201
312/869-6676

Ensign Software
7337 Northview
Boise, ID 83704
208/378-8086

Epyx Inc.
1043 Kiel Court
Sunnyvale, CA 94089
408/745-0700

F

Felsina Software
3175 S. Hoover St., Suite 275
Los Angeles, CA 90007
213/747-8498

Finally Software
4000 MacArthur Blvd.
Newport Beach, CA 92663
714/854-4434

Firebird Software
PO Box 49
Ramsey, NJ 07446
201/934-7373

First Byte
2845 Temple Ave.
Long Beach, CA 90806
213/595-7006

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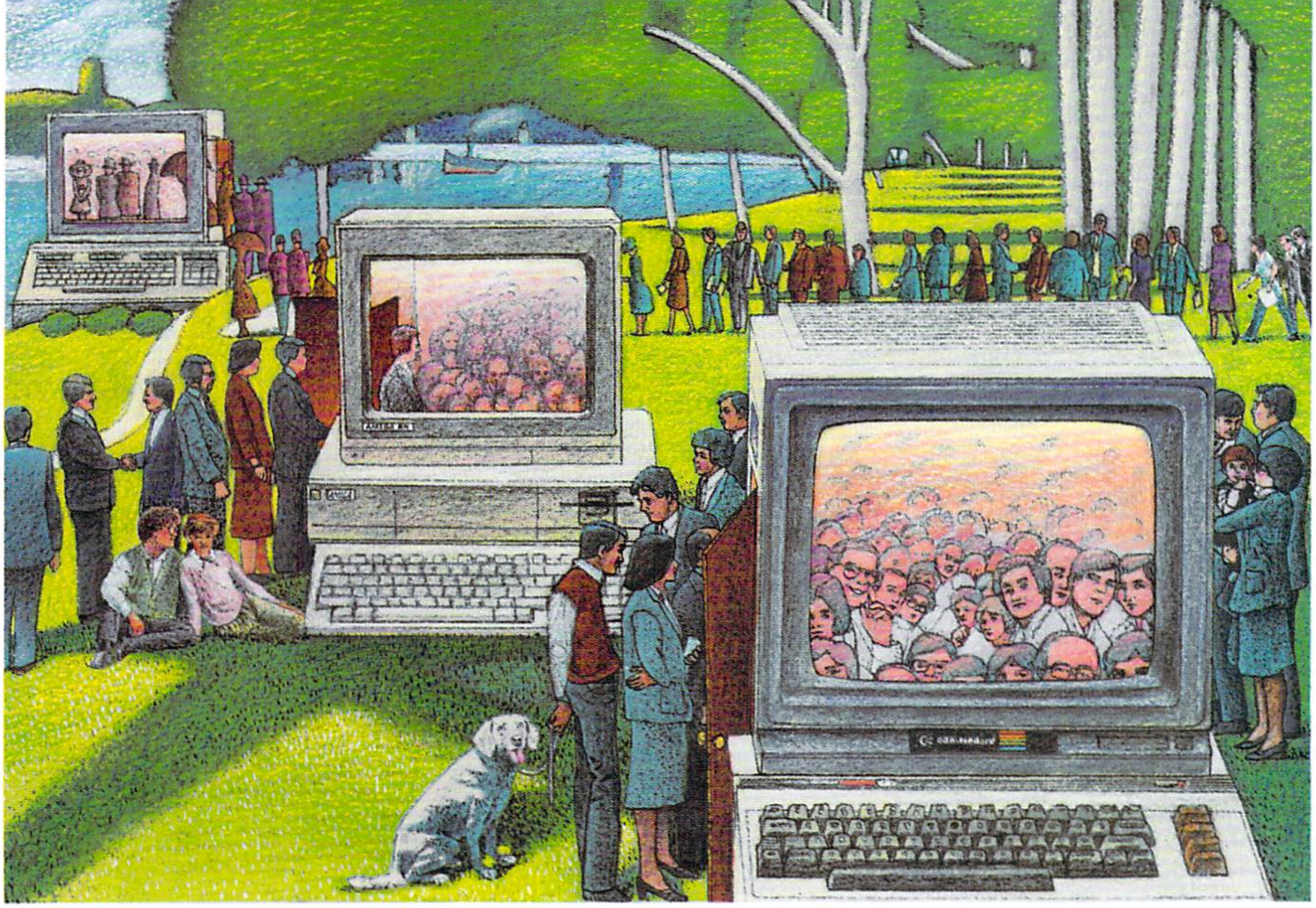
Gamestar
(See Activision)

Gander Software
3223 Bross Road "The Ponds"
Hastings, MI 49058
616/945-2821

Geodesic Publications
PO Box 7
Willow Creek, CA 95573
916/629-3514

Getting Enterprises Inc.
204 Hamilton Road
Bossier City, LA 71112
318/747-4829

Gimpel Software
3207 Hogarth Lane
Collegeville, PA 19426
215/584-4261



Electronic Arts

DeluxePrint $99.95/ Now	Design-print cards, etc., includes Art Disk Vol. 1/ * IFF
DPrint Art (Volume 2) $29.95/ Now	Clip art for DeluxePrint

Interactive Microsystems

MediaPhile $197/ Now	Audio-video control center for Sony EVS 700U Video 8 deck, audio and video storage/ * +

MicroIllusions

Dynamic-CAD $499.95/ Summer 86	2-D CAD, zoom, rotate, isometrics, mechanical drafting, electrical circuits/ * +

MicroMaster Software

Digital Building System $299/ Fall 86	CAD: digital electronics emulator

S. Anthony Studios

LaserUp! Graphics $79.95/ Summer 86	Prints any Amiga screen (or portion) to Apple Laserwriter, IFF, HAM, scaling, page location
LaserUtilities 1	Postscript procedures for text formatting
LaserFonts 1 $39.95ea / Summer 86	3 analytic downloadable fonts, Postscript tutorial; *Postscript (tm, Adobe Systems Inc.) is the Laserwriter's built-in language*

SoftCircuits Inc.

PCB-CAD $1000/ Now	CAD: Printed circuit board layout design and testing/ *

Languages/ Utilities

Company/ Product(s) Price/ On sale	Description
Absoft	
AC/Basic $?/ Late 1986	Microsoft compatible Basic compiler
Fortran 77 $295/ Now	Standard Fortran, for 68000
Capilano Computing Systems	
Hex Utilities $49.95/ Fall	Coverts binary files to hexidecimal, designed for hardware development
Logic Compiler $129.95/ Fall	Defines data for programmable logic arrays/ *

Commodore

Amiga C (Lattice), $149.95/ Now; **Amiga LISP** (Metacomco), $199.95/ Now; **Amiga Macro Assembler**, $99.95/ Now; **Amiga Pascal** (Metacomco), $99.95/ Now; **Amiga TLC Logo** (The Lisp Co.), $99.95/ Now; **WACK Software Toolkit**, $99.95/ Now

Compumed

The Mirror Disk Copier $49.95/ Now	Copies copy-protected disks
The Mirror "Hacker" Package $49.95/ Summer	Analyzes and edits disks of different formats

►

H

Harvsoft
Box 725
Kenmore, NY 14217
716/877-3510

I

Infocom/ Activision
125 Cambridge Park Drive
Cambridge, MA 02140
617/492-6000

INSIGHT/ Lehner Communications
2708 Arlington Ave.
Highland Park, IL 60035
312/432-5458

Interactive Analytic Node
2345 West Medicine Lake Drive
Minneapolis, MN 55441
612/871-6283

Interactive Microsystems
Box 272
Boxford, MA 01921
617/887-9607

J

Jenday Software
PO Box 4313
Garden Grove, CA 92642
714/636-3378

JDK Images
2224 E. 86th St., Suite 14
Bloomington, MN 55420
612/854-7793

JMH Software
7200 Hemlock Lane
Maple Grove, MN 55369
612/424-5464

L

Lattice Inc.
PO Box 3072
Glen Ellyn, IL 60138
312/858-7950

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PO Box 379
Alburg, VT 05440
514/933-4918

M

Magnetic Music
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Rhinebeck, NY 12572
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Multi-Forth	Programming language package, interactive program development	
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Data Research Processing Inc.		
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Delta Research		
J-Forth	Access to all Amiga functions, conforms to 83 standard, expanded instruction set	
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412/775-3000

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Mindscape Inc.
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312/480-7667

Manx Software Systems
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Eatontown, NJ 07724
800/221-0440

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617/576-2760

Marksman Technologies Inc.
Route 5, Box 221A
Santa Fe, NM 87501
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MaxiSoft
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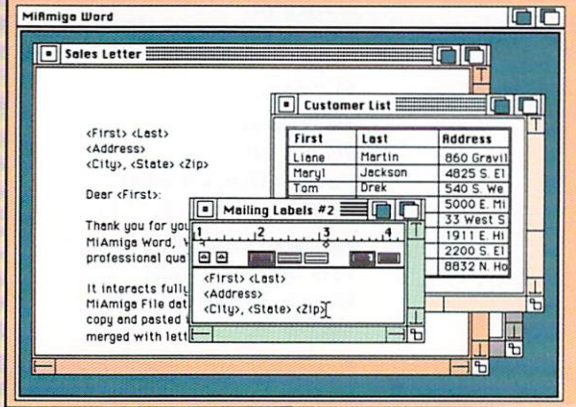
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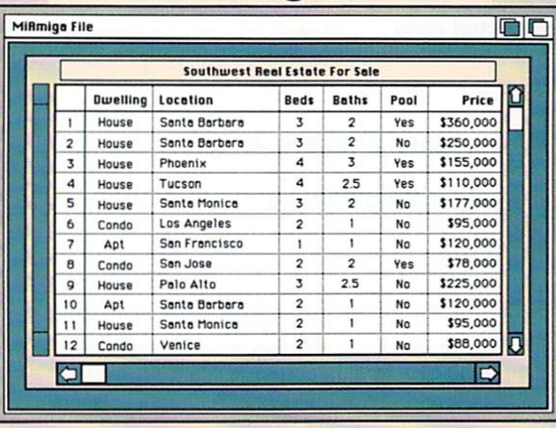
MiAmiga Word



- Multi-Window Editing of separate documents...
- On-line Spelling Checker allows easy insertion of new words...
- Headers and Footers for all, left facing, or right facing pages...
- Search and Replace through entire document...
- User-definable Glossary with easy insertion of new terms...
- Supports large documents...
- Document size limited only by size of disk...
- Cut, copy, paste within and between documents...
- Left and/or right margin justification of text...
- Copy and paste from MiAmiga File database...
- Mail Merge with MiAmiga File database or ASCII file.

MiAmiga File

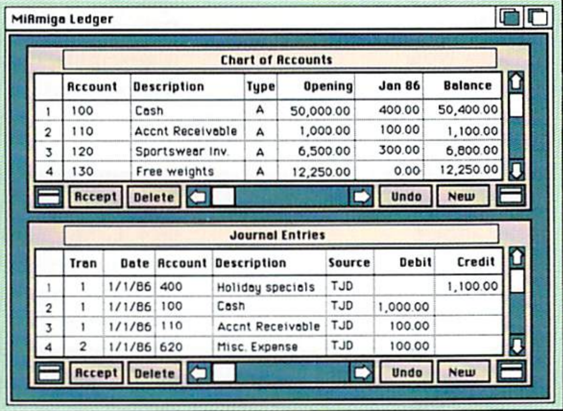
- Easily define column widths, placement and justification...
- Format numeric fields with commas, dollar signs, and/or decimals...
- Transfer quickly between full database and selected records...
- Transfer conveniently from selected record to data entry form...
- Print columnar reports from list including automatic page headings and cumulative totals...



- Format mailing labels by positioning fields on form...
- Automatic scrolling of data within a field during data entry...
- Optionally capitalize the first letter of each word automatically...
- Modify form as needed for convenient placement of data...
- Data entry form automatically created by system during database definition.

MiAmiga Ledger

- Easily define column widths, placement, and justification...
- Multi-window screen allows convenient access to both Chart of Accounts and Journal Entries...
- Edit/Post of Journal Entries to Chart of Accounts...
- User-definable Chart of Accounts...
- Transfer quickly between full GL database and selected records...
- Zoom feature automatically expands windows to full screen size.
- Print columnar reports from list including automatic page headings and cumulative totals...
- Format numeric fields with commas, dollar signs, and/or decimals...
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Aztec C68k/Am-c $499/ Now	Commercial system: includes Make, Grep and Diff, debugger, "vi"-type editor, more
MaxiSoft	
Amiga Programmer's Library $200/ Now	C program developer; requires IBM PC, C Compiler, Amiga Assembler and Linker
MegaSoft Limited	
A Copier $39.95/ Now	Copies copy-protectd disks
A Disk $29.95/ Now	Loads Workbench into RAM for single drive systems
Metacomco/ Tenchstar Inc.	
MCC Utilities $49.95/ Now	For AmigaDOS: Pipes, Pack and Unpack, serial port into second terminal, disassembler, more
Metadigm Inc.	
Metascope: The Debugger $95/ Now	For Assembly language; memory-register access through windows, trace, breakpoints, more
Metascribe: The Editor $85/ Fall	Program editor, multi-windows, macros, Undo command, mouse support, more
Metatools I $69.95/ Fall	Includes Grep, Diff, Compare, Filter text files, Dump, Amiga/PC file transfer
Meta-Soft Inc.	
C Cross-Reference Utility $49.95/ Fall	User-customizable C cross-reference listings of source files
LTR $59.95/ Fall	Line printing spooler, parameters: headers, page numbering, margins
Micro-shell $79.95/ Summer	Developer's utility, Repeat-Rename commands, save and restore development systems, more
MicroDimensions Inc.	
PED $29.95/ Now	Full-screen programmer's text editor, file compare
The Micro Forge	
RAM Disk $24.95/ Now	RAMdisk, improved storage-retrieval speed
MicroMaster Software	
Pick Your Preferences $29.95/ Fall	Create Preference settings, selectable by menu
Microsmiths Inc.	
TD $59.95/ Now	Full-screen utility editor, multi-windows, cut and paste
Northwest Machine Specialties	
HexDump $19.95/ Now	Displays or prints files in hexadecimal
Screen Mapper $89.95/ Late 1986	Designs multi-field screens, subroutine for input/output control
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Power Systems $99.95/ Summer	Development systems for UCSD Pascal, Fortran 77, Basic, Modula-2; Complete line (20+) of ►

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505/523-0371

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Micro Systems Software
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Native, $149/ Now; **Cross-Assembler to IBM**, $249/ Now; **Cross-Assembler to Amiga External Port**, $750/ Now; **Source Code (optional)**, $3,500/ Now

Softeam Inc.	
PC/ET Emulator $69.95/ Summer	IBM-PC Software emulator, no MS-DOS disk needed/ *
Software Supermarket	
Printer Driver Maker (varies)/ Now	Dealer's utility, custom printer driver maker, available through dealers
Spencer Organization	
APL 68000 $?/ Fall	Complete APL.SV with enhancements, multiuser file system, search and replace primitives, more
Softworks	
Softworks Basic $99/ Now	Direct interface to Amiga ROM, true compiler, no editor, compatible with versions for Atari and Mac
Richard Stiles	
UEdit $69.95/ Now	Powerful utility text editor, menu driven, completely user definable, most word processing features, edit 20 files at once
TDI Software Inc.	
Modula-2 $89.95/ Now	Similar to Pascal, with Amiga-specific standard modules and demo programs
Techni Soft	
T-Move $49.95/ Now	Transfers 5¼-inch IBM PC disk files to AmigaDOS
T-UTIL $49.95/ Now	Recovers deleted or damaged files; includes track/sector editor
Tigress	
DISKWIK $49.95/ Now	Restores deleted files, repairs errors, recovers data from damaged files, edits disk bytes/ *
True BASIC Inc.	
True BASIC Language System $149.95/ Now	Compiled, ANSI standardized, library supported and portable/ *
True BASIC Amiga Libraries:	
Advanced String Library $49.95/ Now	Pattern matching, expression scanning, parsing, date and time routines, source code included/ *
Developer's Tool Kit $49.95/ Fall	Machine-specific routines designed to easily access Intuition and kernal/ *
Sorting & Searching $49.95/ Now	Quick, heap and multi-key sorts for both string and numeric sorting. Source code included/ *
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714/980-0440

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206/695-1368

Pecan Software Systems
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Brooklyn, NY 11218
718/851-3100

Polarware/ Penguin Software
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2600 Keslinger Road
Geneva, IL 60134
312/232-1984

Progressive Peripherals and Software
464 Calamath St.
Denver, CO 80204
303/825-4144

Q

The Quality Cottage
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South Bend, IN 46635
219/234-4401

Quelo Inc.
2464 33rd Ave. W, Suite 173
Seattle, WA 98199
206/285-2528

Queue Software
5 Chapel Hill Drive
Fairfield, CT 06432
203/335-0908

Quicksilver Software
418 W. 7th St.
Sioux City, IA 51103
712/258-2018

R

Ramella
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Chico, CA 95926

Revolution Software
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West Chester, PA 19381
215/430-0412

RTL Programming Aids
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$49.95/ Now	Function, Talking Keyboard

UBZ Software **UBZ FORTH** $85/ Now	Forth-83 compatible, multitasking, full-screen editor, AmigaDOS-Intuition support
Westcomp **Amiga Intelligence** $149.95/ Fall	Teaches how to use "AI" in your Amiga Basic programs/ *
Pilot interpreter $30/ Now	Public domain interpreter, sample programs, descriptive material
Zoxso **ZLI** $49.95/ Summer	AmigaDOS enhancement, replaces CLI, adds more functions

Music/ Speech Synthesis

Company/ Product(s) Price/ On sale	Description
Activision **The Music Studio** $59.95/ Now	Composition, controls 15 separate channels simultaneously, print scores, add words, instrument design, MIDI/ *
Commodore **Musicraft** $99.95/ Summer	Write-store-playback musical compositions, Amiga keyboard as musical keyboard, synthesizer feature
Electronic Arts **Deluxe Music Const. Set** $?/ Summer	Professional music scoring-editing, print-play scores, menus, MIDI, IFF/ *
Instant Music $49.95/ Now	Play along with mouse, over 80 songs, various instruments, 4 voices, menus, cut-copy-paste scores, stereo, IFF
Instant Music Data Disk $?/ Late 86	*It's Only Rock 'n' Roll*
Magnetic Music **Texture** $350/ Summer	MIDI-based 24-track composing-recording, assign music patterns to 16 MIDI channels or play different synthesizers-drum machine/ *
Micro W **QRS Music Rolls** $19.95ea/ MIDI Now Native Amiga-Late 86	6 digitized songs per disk, classic recordings, MIDI, piano-roll graphics
Mimetics **SoundScape** $149/ Summer	Professional music central operating system, MIDI-event editor, sequencer, open-expandable system, IFF, separate modules to follow/ *
The Quality Cottage **The Orator** $39.95/ Now	Speech processor, mouse controlled: rate, pitch, tuning, voice; comes with ABasiC and Amiga Basic versions

Continued on page 67

S

S. Anthony Studios
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415/826-6193

Sedonna Software
11844 Rancho Bernardo Road
San Diego, CA 92128
619/451-0151

Sierra On-Line Inc.
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209/683-6858

SKE Software Co.
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813/786-3247

SoftCircuits Inc.
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305/825-4820

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716/873-5321

Softwood Co.
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Santa Barbara, CA 93120

Softworks
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312/975-4030

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303/598-8417

Spencer Organization Inc.
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Westwood, NJ 07675
201/666-6011

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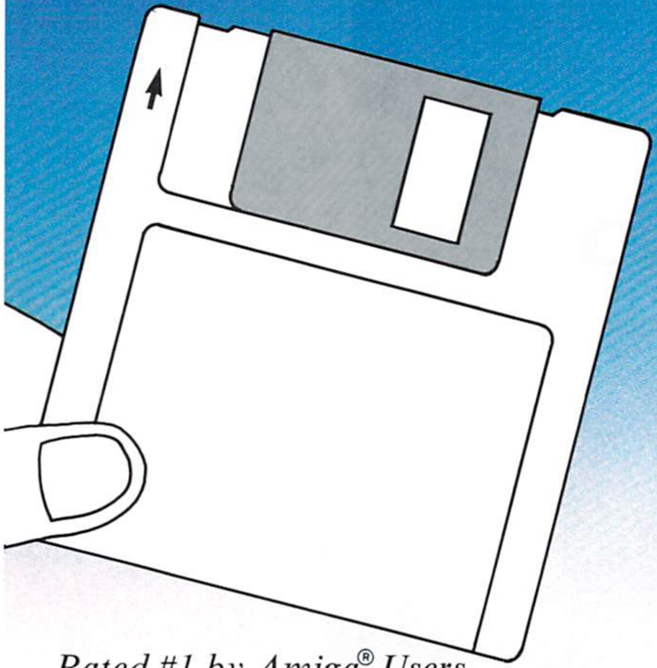
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Continued from page 63

Revolution Software **Soundshop-Bobshop** $49.95/ Summer	Create and edit waveforms, instruments, store music-sound effects (includes graphics program)/ *

Personal: Home/ Financial

Company/ Product(s) **Price/ On sale**	**Description**
Amiga Man **Amiga Man H101** $19.95/ Now	10 home programs, checkbook, calendar, finance, diary, etc.
Batteries Included **Isgur Portfolio** $199.95/ Late 86	Investment portfolio management and tracking; stocks, commodities, etc./ *
Electronic Arts **Financial Cookbook** $59.95/ Now	Fast calculations for investments, financing, interest, insurance, etc., menus
Finally Software **Trendwriter** $99.95/ Fall	Stock market forecasting, speech
Marksman Tech Inc. **PHASAR** $89.95/ Now	Accounts, budgets, taxes, organizer/ *
Olamic Systems Corp. **2 + 2** $99/ Now	Home financial management, phone directory, personal calendar, mailing lists/ *
The Other Guy's **AMT** $39.99/ Fall	Amortization program, interest-principal payments, balloon payments
PAR Software **PAR Home 1** $79.95/ Now **PAR Real 1** $149/ Now	Checkbook, budget, loan interest and comparison, investments, charts/ * Income property analyzer-manager, loan evaluations, multi-reporting/ *
Sedonna Software **Money Mentor** $99.95/ Summer	Tracks transactions, budgeting, 30 separate accounts, voice, graphics

Productivity

Company/ Product(s) **Price/ On sale**	**Description**
Alive Systems **Computer Co-pilot** $900/ Late 86	"Software robot," handles secretarial tasks, communications assistant: telephone and more/ * ►

T

TDI Software Inc.
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818/334-0709

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Tonawanda, NY 14150
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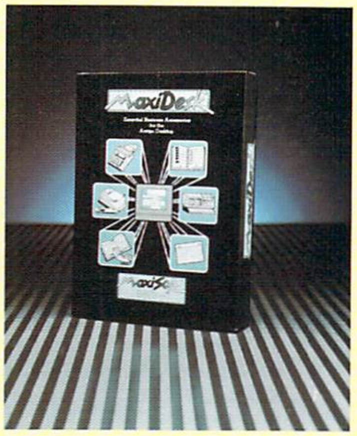
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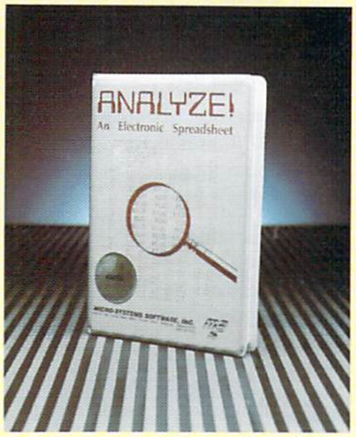
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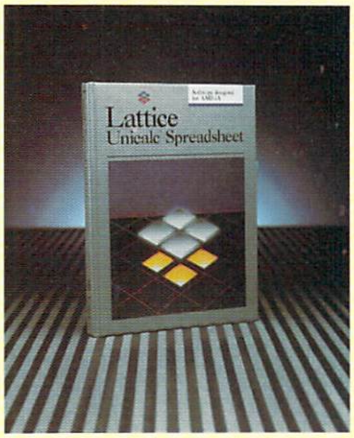
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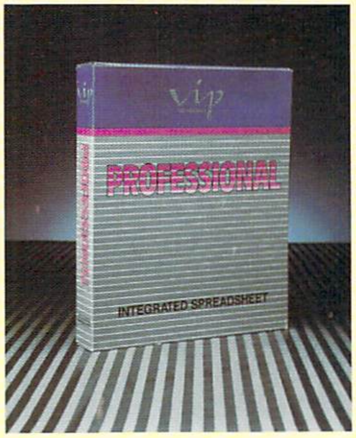
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Orem, UT 84057
801/227-4000

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Byte by Byte **Infominder** $89.95/ Now	Stores-retrieves text and 32-color graphics files, hierarchical organization, menus/ *
Classic Image Software **Disk Library** $49.95/ Fall 86	Files-categorizes-cross references disks-folders-files, view by name-category, 1 or 2 drives or print
Digital Creations **Gizmoz** $49.95/ Now	Calendar, rollodex, memopad, alarm clock, terminal program, 3 calculators, more, movable separately, menus
Gander Software **Time & Task Planner** ($100)/ Now	Appointment scheduler, calendar, week-at-a-glance, requires ABasiC ($110 with ABasiC included)
MaxiSoft **MaxiDesk** $70/ Now	Integrated: calendar, phone utilities and directories, calculator, alarm clock, more
MaxiPower Series: **MaxiMizer** **MaxiCache** **MaxiShare** **MaxiKey** $100 or $29.95ea/ Summer 86	 Mouse-keyboard macro maker RAM buffering for floppies Real-time data sharing for two Amigas Keyboard abbreviation handler
New Horizons Software **Flow** $99.95/ Now	Idea (outline) processor, planner, collapsible outlines, menus
Northeast Software Group **ORDER** $44.95/ Now	Phone directory, calculator, alarm clock, calendar, appointment book, screen dump, graphics scratch pad, speech, menus
Omega Star Software **OnLine AmigaDOS Manual** $29.95/ Now	Info by menus-submenus on commands, devices, directories, formats, etc.
OnLine Amiga Basic Manual $29.95/ Late 86	Information by menus-submenus on commands, how-to, programming tips
Quicksilver Software **Amiga Calculator Construction Kit** $49.95/ Now	Customize your own calculator, 80+ functions, HP-TI emulation
Tychon Technologies **Tychon Utilities** $49.95/ Now	AmigaDOS help files, terminal emulator, print utilities, speech and graphics programs, movable to Workbench

►

Software designed for AMIGA.

Lattice C Compiler — *$149.95*

With more than 30,000 users worldwide, Lattice C Compilers set the industry standard for MS-DOS software development. Lattice C gives you all you need for development of programs on the AMIGA. Lattice C is a full implementation of Kernighan and Ritchie with the ANSI C extensions and many additional features.

AMIGA C Cross Compiler — *$250.00*

Allows AMIGA development on your MS-DOS system. Price includes the above product.

Lattice Screen Editor (LSE™) — *$100.00*

Designed as a programmer's editor, *Lattice Screen Editor (LSE)* is fast, flexible and easy to learn. *LSE's* multi-window environment provides all the editor functions you need including block moves, pattern searches and "cut and paste." In addition, *LSE* offers special features for programmers such as an error tracking mode and three Assembly Language input modes. You can also create macros or customize keystrokes, menus, and prompts to your style and preferences.

Lattice dBC III Library™ — *$150.00*

The *dBC III library* lets you create, access and update files that are compatible with Ashton-Tate's dBASE system. *dBC III's* C functions let you extend existing dBASE applications or allow your users to process their data using *dBC III* or dBASE III.

Lattice Make Utility (LMK™) — *$125.00*

An automated product generation utility compatible with UNIX Make, *Lattice Make Utility (LMK)* lets you rebuild complex programs with a single command. Once you specify the relationships of the various pieces of your system in a dependency file, *LMK* automatically rebuilds your system the same way every time, and only compiles program files that have changed. But *LMK* is not limited to updating programs. You can use *LMK* to update documentation or perform **any** executable command!

Lattice Text Utilities™ — *$75.00*

Lattice Text Utilities (LTU) consists of eight software tools to help you manage your text files. GREP searches files for the specified pattern. DIFF compares two files and lists their differences. EXTRACT creates a list of file names to be extracted from the current directory. BUILD creates batch files from a previously generated file name list. WC displays the number of characters and optionally the checksum of a specified file. ED is a line editor which can utilize output from other *LTU* software in an automated batch mode. SPLAT searches files for a specified character string and replaces every occurrence with a specified string. And FILES lists, copies, erases or removes files or entire directory structures which meet the specified conditions.

Lattice Unicalc® Spreadsheet — *$79.95*

Unicalc is a simple-to-operate program that turns your AMIGA computer into an electronic spreadsheet. Using *Unicalc* you can easily create sales reports, expense accounts, balance sheets, or any other reports you had to do manually.

Unicalc offers the versatility you've come to expect from business software, plus the speed and processing power of the AMIGA.

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Lattice MacLibrary™ — *$100.00*

The *Lattice MacLibrary™* is a collection of more than sixty C functions which allow you to quickly and efficiently take advantage of the powerful capabilities of the AMIGA.

Even if your knowledge of the AMIGA is limited, *MacLibrary* can ease your job of implementing screens, windows and gadgets by utilizing the functions, examples and sample programs included with the package.

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Panel™ — *$195.00*

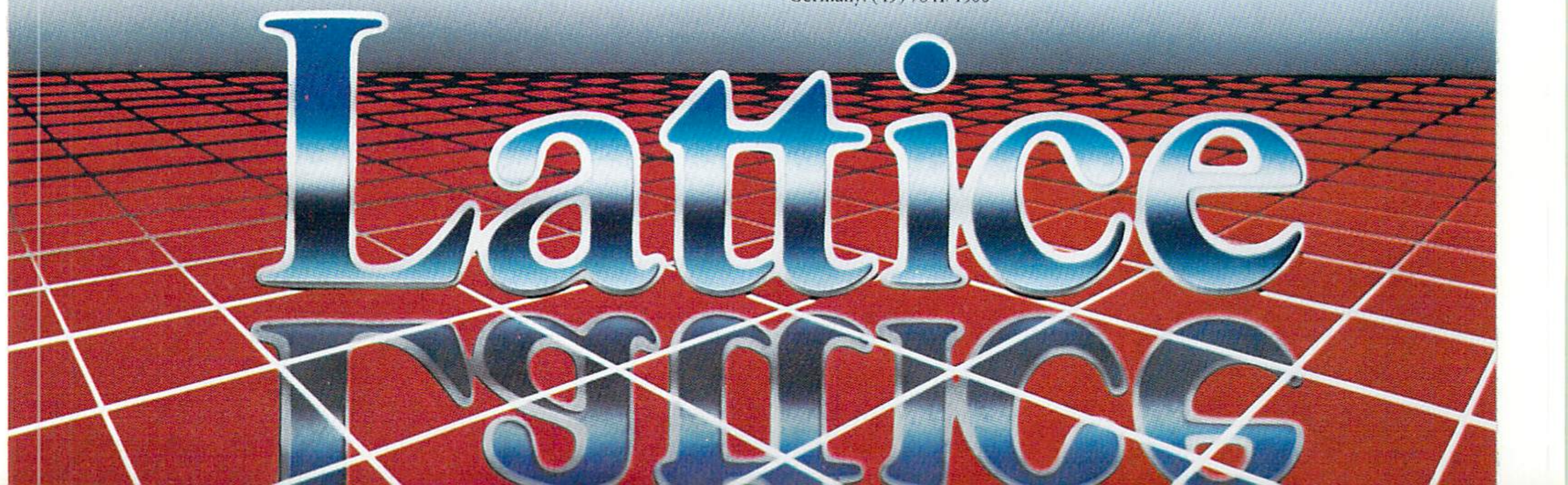
Panel will help you write your screen programs and layer your screen designs with up to ten overlapping images. *Panel's* screen layouts can be assigned to individual windows and may be dynamically loaded from files or compiled into a program. *Panel* will output C source for including in your applications. A monitor and keyboard utility is also included to allow you to customize your applications for other systems.

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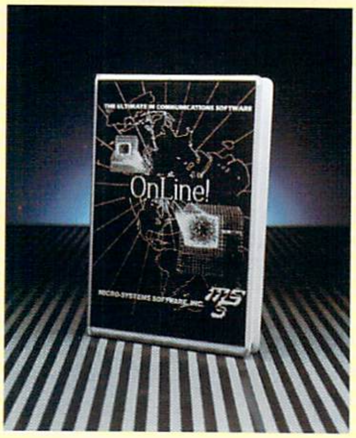
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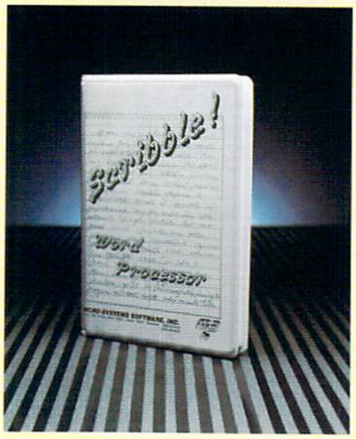
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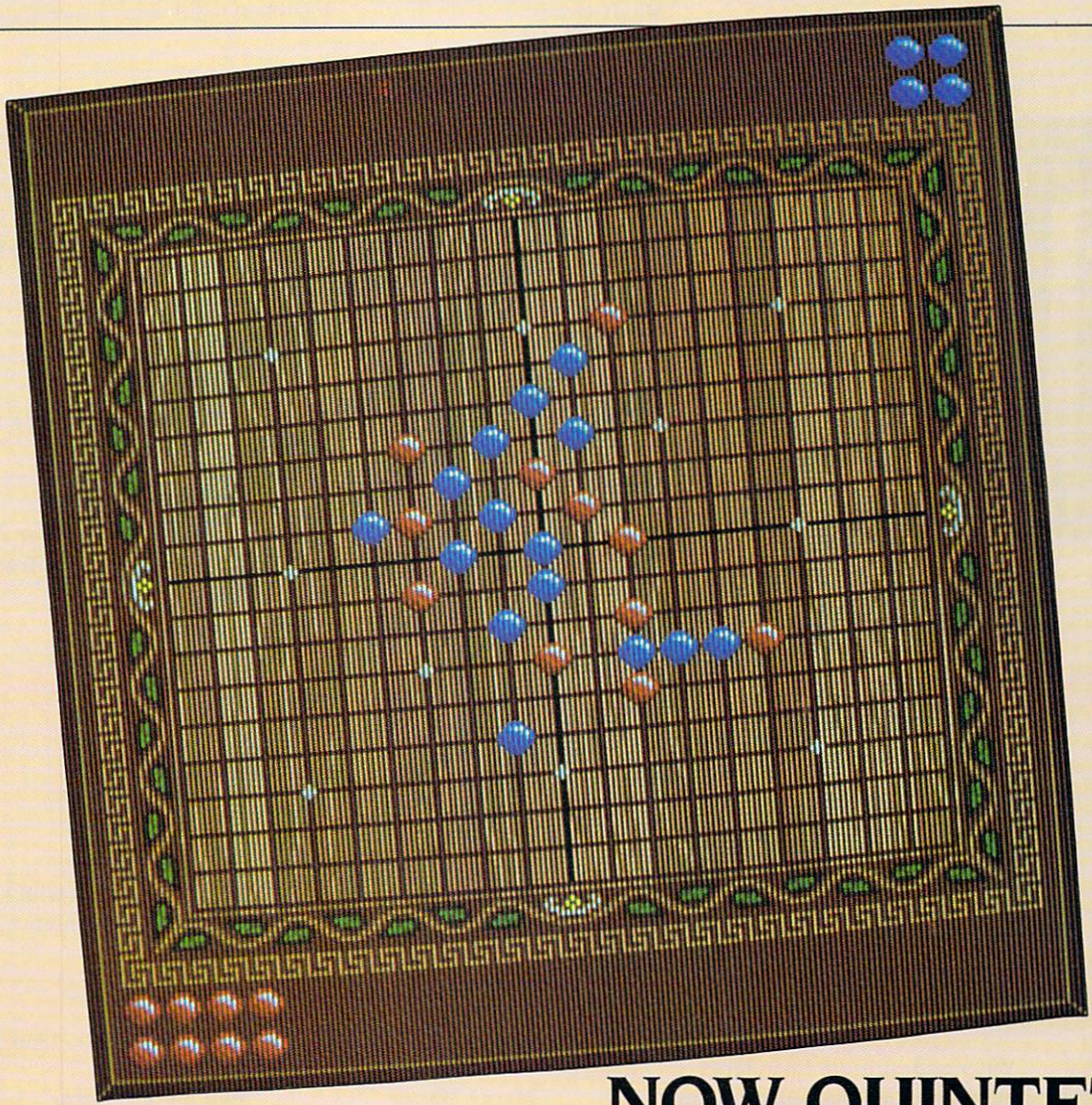
Spreadsheets

Company/ Product(s) Price/ On sale	Description
Batteries Included **BTS The Spreadsheet** $69.95/ Late 86	1000 × 1000, math, statistics, financial functions
Digital Solutions **LPD Planner** $75–$150/ Fall	Multi-SSs, 256 × 65,536, graphs, charts, can be integrated with other LPD products
Lattice Inc. **Unicalc** $79.95/ Now	8192 × 256, non-Workbench, dual-window, import-export DIF files
MaxiSoft **MaxiPlan** $150/ Summer	16384 × 512, multi-tasking, color graphics, database, speech, Lotus 1-2-3 data file conversion/ *
Micro-Systems Software **Analyze!** $149.95/ Now	8192 × 256, pull-down menus, multitasking, color graphics
Progressive Peripherals and Software **Logistix** $249.95/ Summer	Integrated: 2048 × 1024 spreadsheet, database, timesheet, presentation graphics, reads 1-2-3, dBase, DIF files
VIP Technologies **VIP Professional** $199.95/ Now	8192 × 256, 1-2-3 work-alike and file compatibility, database, graphs, more than 512K recommended

Telecommunications

Company/ Product(s) Price/ On sale	Description
Aegis Development **Diga!** $?/ Late 86	Multitasking, macros, address cards, full-featured telecommunications program
Commodore **Amiga Term** $?/ Summer	Up to 130-column display, menus, windows, Kermit
Digital Creations **Digital Link** $69.95/ Now	Transfer files between Amiga, Macintosh, IBM PC, (includes 3 disks) 300–56.6K baud, terminal emulation
Eight Stars Software **Starnet** $99.95/ Fall	BBS network system, upload, download, X-modem protocol support, passwords/ *

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QUINTETTE.™
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If you think good entertainment is hard to find in the 20th Century, imagine the plight of those in ancient China some four milleniums ago. Tending a heard of yaks loses its fascination pretty fast. Climbing Mt. Everest was definitely out of the question. And Peking — the nearest hot spot — wasn't exactly a stone's throw away.

So being the clever people that they were, the ancient Chinese developed a game to pass the time and enrich the mind — a game we now call Quintette.



The premise is simple and easy to learn: align five stones in a row, or capture five pair of your opponent's. The strategies, however, are challenging and complex: will your adversary lure you into capturing yourself? Or will they go for broke, allowing you to snatch victory from defeat? The outcomes are infinite and the process thoroughly absorbing, as Quintette is playable in pairs, teams, or against the computer itself.

Since that day many thousands of years ago, Quintette has traveled 'round the globe, entertaining millions of people along the way. And now, thanks to Miles Computing, you can share the intrigue on modern man's most vivid game board, AMIGA.

We think Confucius would be proud.

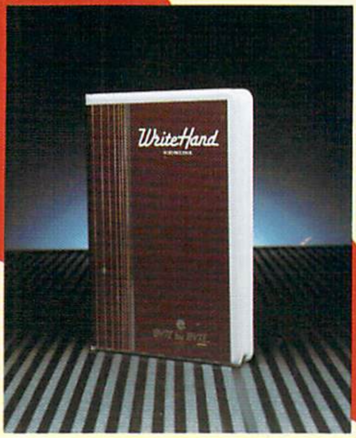
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Felsina Software **A-Talk** $49.95/ Now	300–19200 baud, speech synthesis, Kermit, phone directory
Maxisoft **MaxiComm** $49.95/ Now	300–9600 baud, auto-answer, auto-dial, menus
MegaSoft **A Term** $49.95/ Now	300–38400 baud, call-answer back, auto-print, auto-speak, phone directory
Micro-Systems Software **BBS-PC** $99.95/ Now **Online!** $69.95/ Now	Upload-download, message reformatting, private mail, user records 300–19200 baud, number and settings storage
SKE Software Co. **SKEterm** $49.95/ Now	Up to 19200 baud, phone directory, supports background file transfer
Techni Soft **T-Link** $59.95/ Now	Auto-dial, auto-redial, number storage, various protocols, buyer gets 1 year free on Techni Soft's BBS



Word Processing

Company/ Product Price/ On sale	Description
Batteries Included **PaperClip Elite** $129.95/ Late 86 **Thunder** $39.95/ Late 86	WP, windows, integrated text/graphics, spelling checker, idea processor/ * Spelling checker, 50,000 words, speedtypist, document analyzer
Byte by Byte **Write Hand** $50/ Now	WP, non-Intuition, form letter generation, special function keys
Commodore **Textcraft** $99.95/ Now **Textcraft Plus** $?/ Summer	WP, menus, templates, help tutorials, typestyles include superscripts and subscripts WP, workbench interface, fonts, multiple document, print spooler, mail merge/ *
The Computer Club **Nancy** $60/ Now	Spelling checker, 80,000 words, supports two auxiliary dictionaries, *Textcraft-Scribble!*-ASCII
Digital Solutions **LPD Writer** $75–$150/ Fall	WP, multi-document, can be integrated with other two LPD products (DB, SS) (special price if you buy all three)/ *

Company/ Product Price/ On sale	Description
Finally Software **Talker** $69.95/ Fall	WP, full-function with speech synthesis by letter-word-sentence, fonts, menus-commands
Megatronics **Spellcraft** **Merge Master** $24.95ea/ Now	Spelling checker, 40,000 + , *Textcraft*, *Scribble!* Mail merge system
Micro-Systems Software **Scribble!** $99.95/ Now	WP, workbench interface, multi-document, transfer between windows, spelling checker, mail merge
Ramella **Eartype** ($5.50)/ Now	WP, speech: for blind, sight-impaired, (materials costs only), with cassette instructions, add $1.50
RTL Programming Aids **Wordwright** $75/ Summer	WP, printout control, macros/ *
WordPerfect Corp. **WordPerfect** $? / Late 86	WP, Amiga version of best-seller for IBM, thesaurus, dictionary, lines, multi-document windows, math capabilities/ *

1986 *AmigaWorld* Editors' Choice Awards

This year, and every year, we will be giving out *AmigaWorld* Editors' Choice Awards. These awards are purely subjective. The system we used for selection of the products was completely unscientific, biased in the extreme, and in no way reflected the unanimous opinions of the entire staff (in fact, there were some pretty heated arguments over a few of the selections).

In general, we chose products that we felt deserved some kind of extra recognition. Products that we felt were important to the success of the Amiga. Some products were just far and away the best in their field, while others may not be the best, but were important for other reasons. This list of awards should not be considered an endorsement of the products, nor should it be used as a buyer's guide when shopping around. Perhaps next year we will give the "ten BEST products for the Amiga" awards. This year, however, was just a bit too chaotic, and we know of a few products due out in the next few months that will outshine everything that has gone before. So, complete with explanations, rationalizations and congratulations, here are the awards. Ta da...

Textcraft (Developed by Arctronics; marketed by Commodore). This word processor is probably the most berated (and hated) piece of software developed for the Amiga. So why did it make it on our list? It is not the best word processor available for the Amiga, but it was the first. It was the first real software of any kind available for the Amiga, and it is one of the most durable. It went through Workbench version changes without being recalled. It was the first software to really make use of the mouse, menu and window environment. It performed as advertised. It was easy to learn and use, and it gave us all something to do while waiting for more software to be developed.

DeluxePaint (Electronic Arts). It could be argued that DeluxePaint is the best graphics program developed for any computer. It makes use of just about every graphics feature of the Amiga and its menu, mouse and window environment. It is a fun program, a good program, and it was out early. The art created with DPaint impressed a lot of people and probably influenced a large percentage of potential buyers. It made the Atari ST artwork look bad. It made the Amiga shine.

Instant Music (Electronic Arts). Most fun you can have with your Amiga and your ears. Not for the serious musician, but how many of us are serious musicians? This program lets anybody create music that sounds good. It is fun to play with. It puts out some impressive music. It is easy to use and helps the musically illiterate enjoy the sound capabilities of the Amiga.

Aegis Animator (Aegis Development). The Animator is a program in a class by itself. In fact, it created a whole new class. The Animator allows you to do things with the Amiga that can't be done on any other computer. It allows full-blown computer animation on a system that doesn't cost $100,000. The program is unique in more ways than one. We were thinking of giving it a separate award for most amusing and unique prompts and command names (e.g., clone, destroy, tweening, ghost mode, morph, etc.). It uses animation techniques unlike any other system or program. It was the first program of its kind, but it probably won't be the last.

Lattice C Compiler (Lattice Inc.). We don't program in C and you may not program in C, but chances are excellent that if you own any Amiga software, the people who developed it were using a C compiler; if that software is more than a few months old, it was probably developed with the Lattice C Compiler. The award should probably go to Lattice Inc. itself rather than the compiler, because they were one of the major driving forces behind the development of Amiga software. They had hot lines, updates, BBSs and lots of information, and they did a lot to help those who were trying to develop products for the rest of us to use. This is a bit like giving an award to the shipbuilders who got Christopher Columbus on his way, but if we don't thank them, then who will?

The Speed Pad (Innovative Technologies). What?! I know what you are all saying. "What kind of drugs are those editors on anyway? How could they give an award to a piece of rubber?" Well, to be honest, there was a lot of discussion about this one. Half of us thought that it was absurd to give an award to the Speed Pad, while the other half felt that it is a damn good product that is helpful, useful, relatively inexpensive and a worthwhile peripheral that does what it's supposed to do.

Live! and Genlock. These two products (that don't exist) have caused more stir in the Amiga market than any others. More people can't wait to get their hands on one or the other (even though they aren't ready for sale at the time of this writing) than almost anything else. We get more calls and letters from people wanting to know where to buy them (you can't), who makes them (A-Squared developed the Live! digitizer, but Commodore is supposed to be manufacturing and marketing both products), and when they will be available (who knows?). People have lots of plans for these products (when they start selling) and there is a lot of excitement about them. Accepting the award for Commodore is NewTek, manufacturers of the Digi-View color digitizer.

AX2000 2MB RAM board (Comspec). One of the first and fairly inexpensive—a good board. Now that it's auto-config, it is a nice piece of hardware that lets you use the full power of some of those memory eating programs. There may be cheaper RAM boards coming along, but right now the AX2000 is a good all-around performer.

Mindwalker (Commodore). This game was making the rounds through the underground for quite some time before it was released officially. The game is so weird that, after playing it for quite a while, we never did figure out what was going on or what we were supposed to do or what the object of the game was or how to get where we were supposed to go. Not until the final program came out with the instructions did we realize what was supposed to be going on. But not knowing was just as fun as knowing and the graphics are nice. No doubt a twisted mind created this game. We like it.

Soundscape (Mimetics). This is the first major serious music software for the Amiga, and it comes from a company that is pretty serious itself. For all the musicians out there who bought an Amiga strictly for its musical capabilities, Soundscape is the product to get them going. It may be overtaken eventually by other serious music software, but for now it is number one.

The following are a handful of other products and companies that we felt deserved mention for their contributions, even if they only received one or two votes from our editors:

Transformer (Commodore). Long awaited and talked about. The Transformer (and hopefully the Sidecar, whenever it shows up) open up the world of MS-DOS software for the Amiga, something that a lot of people want. So many people, in fact, that we thought it deserved mention.

Okimate 20 Color Printer (Okidata). Inexpensive and fairly good quality color output. This is the Volkswagen beetle of color printers. It won't win any races for speed or handling, but we have seen more Okimate 20s out there than any other color printer.

Seven Cities of Gold (Electronic Arts). A game that we ended up playing a lot around the office. (While we are at it, we might give partial awards to Arctic Fox and One-on-One as well.) Seven cities is solid, playable and fun. What else do you want from a game?

DeluxeVideo (Electronic Arts). Aegis Animator broke the ground and DeluxeVideo is coming on strong. Desktop video is a new field, and this and other programs of its type will need some time and creative people working with them to really show what can be done.

Brataccas (Mindscape). "The games of the future will probably look like this," says one of our editors.

VIP Professional (VIP Technologies). An integrated spreadsheet and Lotus 1-2-3 clone. When you get tired of playing around with the others and want to get serious, VIP Professional is something worth looking into. If nothing else, you can learn 1-2-3, which seems to be a standard in the MS-DOS world.

Rags to Riches (Chang Labs). The first really serious software for the Amiga. An integrated accounting package that doesn't really make use of all the Amiga's features, but if you need an accounting package, those features probably aren't your primary concern.

Amiga Manuals and reference books (Addison-Wesley and Bantam Books). Where would any of us be without manuals? These two book publishers got invaluable materials into the hands of everyone, including those who don't have developer status. Commodore wrote most of the original material, but someone had to publish it.

Honorable (and Dishonorable) Mention

On the lighter side, here are a few other awards that we couldn't resist giving away. We can dish it out if you can take it.



The "Please Mister Postman" Award
Amiga Live! (A-Squared) and ***Genlock***. To the products for which we've waited so patiently by the mailbox (and which we've received the most phone calls about).

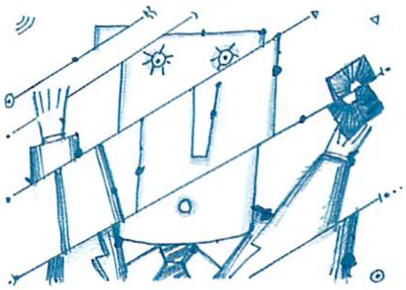
The UPS Award
Electronic Arts. To the company we would most like to see UPS packages from.



The Heinz Ketchup Award
Okimate 20 (Okidata). For keeping us in anticipation while it takes 15 minutes to print a picture.

The Bait-and-Switch Award
Commodore Business Machines. For promising IBM compatibility at $100 (Transformer) and delivering it (?) at "substantially less than $1,000" (Sidecar).

The Charles Goodyear Award
The Speed Pad (Innovative Technologies). To the most useful piece of rubber in the microcomputer industry.

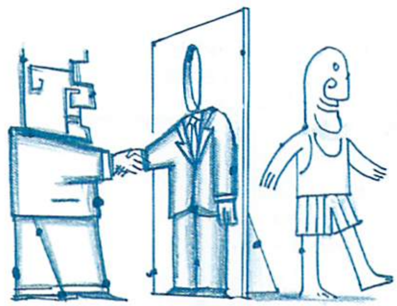


The Timothy Leary Award
Mindwalker (Commodore). To the program that best simulates a psychedelic experience.

The Roll Over Beethoven Award
Instant Music (Electronic Arts). For turning the complete idiot into a composer.

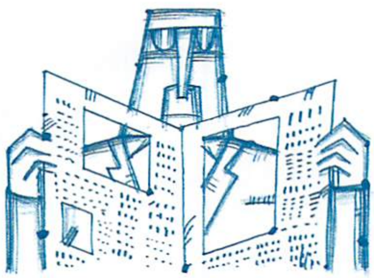
Bob Ryan's Best Program in the History of Creation Award
Instant Music (Electronic Arts).

The Guy Wright Award
Textcraft (Commodore). The word processor that Guy keeps insisting is "not all that bad."



The Vapor Company Award
Cherry Lane Technologies.

The Vaporware Award
Borland International, Broderbund and The Software Group. For taking out full page ads in the Premiere issue of *AmigaWorld* and never releasing a product.



The Vapor Article Award
AmigaWorld. For publishing an article about a vapor company.

Part 2

Amiga Basic Graphics Primer

Making your Amiga come alive with animation is easy using Amiga Basic's powerful but easy-to-use graphics commands.

By Tim Knight

One of the most prominent features of Amiga Basic is its ability to create realistic animation. The large number of commands made especially for the purpose of animation shows that the creators of Amiga Basic recognized the computer's excellent graphics capability, and for the end user, this means that creating and animating colorful figures and objects is easier on the Amiga than on any other personal computer.

The Object Editor

In order to produce animation, you must first create the objects that you want animated. On the Amiga Extras disk (the one with Amiga Basic on it), there is a Basic program called ObjEdit. This is a simple drawing program that lets you create multicolored pictures with the mouse. You can use the mouse to draw freehand, make shapes or straight lines, and erase. You can change the color you are drawing with at any time.

When you double-click the ObjEdit icon, the computer will ask you whether you want to create BOBs or sprites. Both of these are graphics images, but BOBs are more flexible since you can make them with any color and put as many of them on the screen as you like. Their size is limited only by your Amiga's memory. Although sprites can move faster than BOBs, their width is limited to 16 pixels; only four sprites with different colors can be on the same line at the same time, and only three colors can be in any one sprite.

Once you've decided whether to draw a BOB or a sprite, the Object Editor screen will appear. The menu ►

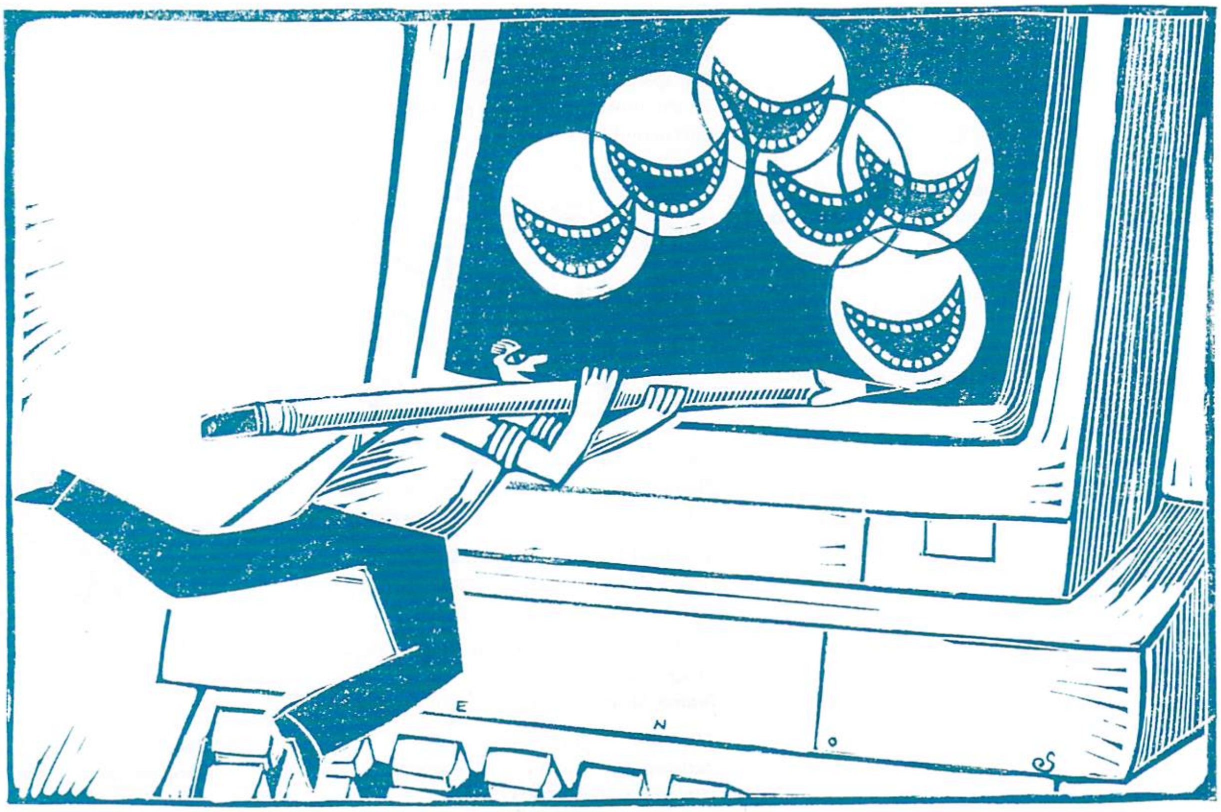


Illustration by Randall Enos



Actual unretouched photo.

Aim your video camera and let **Digi-View** capture images with breathtaking clarity. Then use friendly, on screen controls to adjust brightness, contrast and color for the ultimate image. **Digi-View** uses the **Amiga's** exclusive hold-and-modify mode and sophisticated dithering techniques to display broadcast-quality color photographs. **Digi-View's** superb color resolution is made possible by a precision color-separation process that uses color filters (included) and an inexpensive black and white video camera to resolve an amazing 21 bits per pixel, or over 2 million shades.

In the monochrome mode, **Digi-View** features resolution of up to 640x400 with 128 gray levels. Special image processing software eliminates flickering and contour effects. IFF disk format lets you transfer pictures to other **Amiga** graphics programs. For scientific image processing or just plain fun, to exploit the full power of **Amiga** graphics, see your **Amiga** dealer or call toll free for your **Digi-View** video digitizer.

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High-Res 640x400	20 seconds
Low-Res 320x200	10 seconds
Color Separation 320x200	30 seconds

Requires RS-170 Monochrome or RGB Camera with 2:1 interlace

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DIGI-VIEW

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Suite B3
Topeka, Kansas 66603

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◀ bar at the top of the screen has two items to choose from: File and Tools. The File menu allows you to load ("Open") and save objects, erase the current image so you can start a new one ("New"), and quit the Object Editor program so you can return to Amiga Basic. The Tools menu has the following drawing options:

1. *Pen* makes the mouse a freehand drawing tool.

2. *Line* allows you to use the mouse to point to a pixel on the image drawing canvas, hold down the left mouse button and move the pointer to another pixel. A straight line will be drawn between these two pixels when you release the mouse button.

3. *Oval* lets you point to a pixel on the screen and, while holding down the left mouse button, move the pointer to a different part of the drawing canvas. As you are holding down the button, a rectangle will be displayed showing where the boundaries of the ellipse will be if you release the mouse button. Once you release the button, the rectangle will disappear and an ellipse will be drawn.

4. *Rectangle* works much like the Oval command, except that when the left mouse button is released, a rectangle will be drawn exactly like the one you see displayed on the screen as you are moving the pointer around.

5. *Erase* makes the pointer for the mouse act as an eraser when you hold down the left mouse button.

The canvas is the area bounded by the rectangle where you can draw you object. You can use the size gadget at the lower-right corner of the canvas in order to change the size of the drawing area. If you're drawing a BOB, you can make the canvas any size you want. However, if you're drawing a sprite, you can only increase the vertical length of the canvas. But in either case, if you're going to select the 4 × 4 option from the menu bar (which magnifies the drawing canvas four times so you can get a better look at what you're drawing), you shouldn't expand the width of the canvas.

What you draw on the canvas is entirely up to you. If you want to create an animated figure, such as a stick man walking across the screen, you should first draw your basic picture, save it onto the disk with an appropriate name (such as "Stick1"), and then modify that picture so that the arms and legs are altered several times to create a number of pictures for your animation. You could create Stick2, Stick3, Stick4, and so on until you have enough images to make a figure that is smoothly animated.

For this article, I first created a simple object called "Smile," which was a smiling face. Although I'm only using one object, the animation commands give me the ability to move it around the screen with ease. If I had wanted the face to appear to move its mouth, perhaps in conjuction with a voice synthesis program, I could have made "Smile2" and "Smile3," which would be modifications of the original "Smile" object; by quickly superimposing these three objects, I could successfully create the illusion of a moving mouth on a face.

Getting Ready for Animation

In order to get an object off the disk and into the computer's memory, you will need to use the OPEN command. Remember that all of these programs require object files with the same names as those specified in the OPEN command(s); therefore, make sure you create the files with ObjEdit before you run any of the programs. When you are loading files for animation programs, you simply need to type:

OPEN "*filename*" FOR INPUT AS
  #number

filename is the name of the object you saved to the disk (in my case, "SMILE"), while *number* is the number you would like to assign to the object. To keep things simple, it's usually best to assign the first object you load the number 1, the second object you load number 2, and so on. In order to get the "Smile" object into memory, I would enter into the List window of Amiga Basic:

```
OPEN "SMILE" FOR INPUT AS #1
```

The OBJECT.SHAPE command is necessary for the Amiga to know some characteristics of an object, such as its color and shape. Because this information is already stored in the file you saved from the object editor, you only need to type:

OBJECT.SHAPE *number*,INPUT$(LOF(*number*),*number*)

number is the object number that you are using, while the INPUT$(LOF(*number*),*number*) gets the information from the object file you've loaded. A CLOSE statement, followed by the object number, is also required. Therefore, the next lines of my program would be:

```
OBJECT.SHAPE 1,INPUT$(LOF(1),1)
CLOSE 1
```

This covers the fundamental commands you need to use to set up the computer for animation programming. Now we'll examine some of the commands you can use to place the object you've loaded into a specific location on the screen and get it to move around.

Making Things Move

In order to place an object in a specific (X,Y) location, you can use the OBJECT.X and OBJECT.Y commands. When you follow either of these commands with the object number and then the coordinate location where you want the object, the Amiga will place the object at that coordinate. Your coordinate system is not limited by the 640 × 200 pixel screen, however; you can have X- and Y-coordinates ranging from −32768 to 32767 for simulations that go "beyond the screen."

For the purposes of the program that we are using, we'll place the smiling face at location (10,50) (Photo 1):

```
OBJECT.X 1,10
OBJECT.Y 1,50
```

Next we make the face visible with the OBJECT.ON command. OBJECT.ON and OBJECT.OFF, followed by the object number or numbers you are working with, will make one or more objects visible or invisible, ▶



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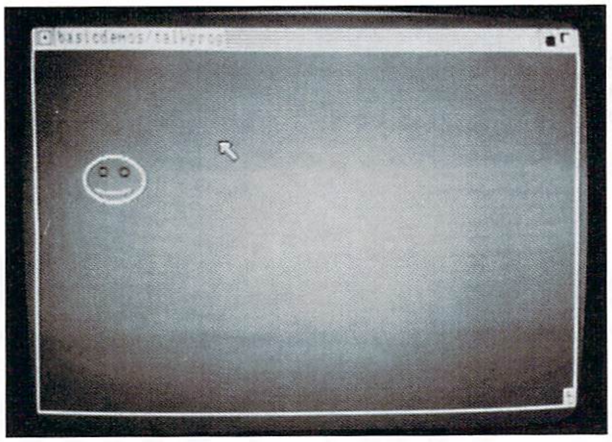


Photo 1.

respectively. If you don't specify an object number after OBJECT.ON or OBJECT.OFF, the Amiga will assume you want all of the objects in memory made visible or invisible. Next, the OBJECT.START and OBJECT.STOP commands can be used to put an object into motion (once motion commands are issued) or freeze the object in its current position. As with OBJECT.ON and OBJECT.OFF, you can follow OBJECT.START or OBJECT.STOP with as many object numbers as you like. Add the following line to the program:

```
OBJECT.ON
OBJECT.OFF
```

Now that the object is on the screen, we can make it bounce around to different X-coordinates with the OBJECT.X command:

```
MOVE:
  OBJECT.X 1,RND*600
GOTO MOVE
```

Notice when you run this program that the object's position on the Y-axis (its vertical position) is constant, while the X-coordinate changes randomly. Make sure the program looks like the one below, then go ahead and type RUN.

```
OPEN "SMILE" FOR INPUT AS #1
OBJECT.SHAPE 1,INPUT$(LOF(1),1)
CLOSE 1
OBJECT.X 1,10
OBJECT.Y 1,50
OBJECT.ON
OBJECT.START
MOVE:
  OBJECT.X 1,RND*600
GOTO MOVE
```

Change the second to the last line from OBJECT.X to OBJECT.Y to make the object randomly change its vertical rather than its horizontal location. The MOVE subroutine should look like this before you run the program:

```
MOVE:
  OBJECT.Y 1,RND*180
GOTO MOVE
```

Next try combining the OBJECT.X and OBJECT.Y commands in the move subroutine so that the face jumps all over the screen:

```
MOVE:
  OBJECT.X 1,RND*600
  OBJECT.Y 1,RND*600
GOTO MOVE
```

A more sophisticaed way to move objects around the screen is with the OBJECT.VX and OBJECT.VY commands. These determine the velocity of an object in pixels per second, and the Amiga uses its internal clock to move the objects as the program is running. The format for these commands is:

OBJECT.VX (or .VY) *number,velocity*

number, of course, is the object number, while *velocity* is how many pixels per second in the horizontal (.VX) or vertical (.VY) direction the object will move. The first part of this next simple program is the same as the one you just typed into the Amiga:

```
OPEN "SMILE" FOR INPUT AS #1
OBJECT.SHAPE 1,INPUT$(LOF(1),1)
CLOSE 1
OBJECT.X 1,10
OBJECT.Y 1,50
OBJECT.ON
OBJECT.START
```

In order to keep the computer "busy," we can use a FOR/NEXT loop so that the object is allowed to move across the screen. Even though this loop counts from 1 to 1,000, the object doesn't move 1,000 times; it simply moves the object 50 pixels both horizontally and vertically every second:

```
FOR I = 1 TO 1000
  OBJECT.VX 1,50
  OBJECT.VY 1,50
NEXT
```

The OBJECT.AX and OBJECT.AY commands are even more useful since they can accelerate an object across the screen rather than just move it at a constant velocity. Acceleration is measured in pixels *per second per second*, and the loop below will move the object both down and to the right at 5 pixels per second per second for both directions. Notice how the object quickly picks up speed as it moves:

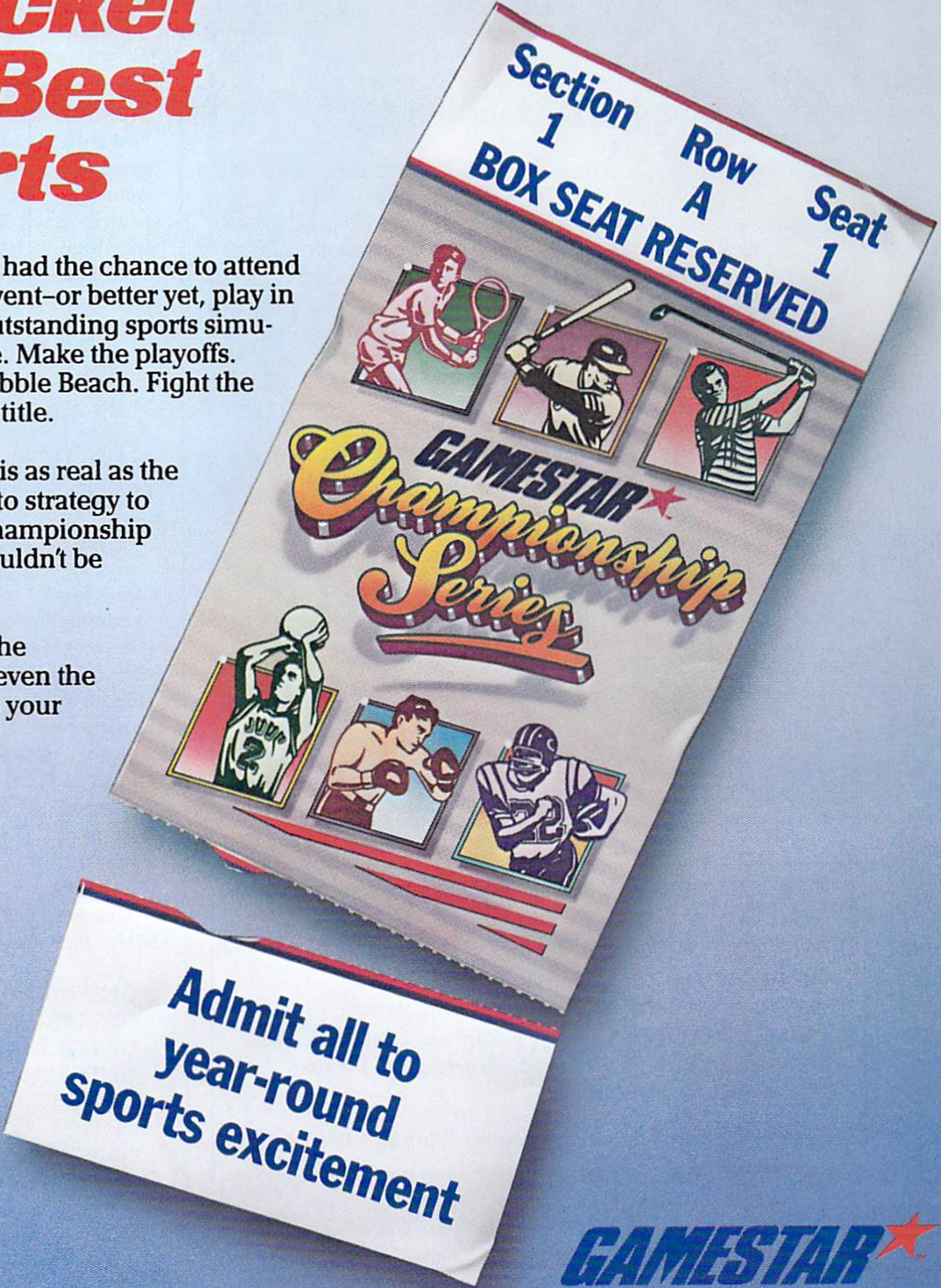
```
FOR I = 1 TO 1000
  OBJECT.AX 1,5
```

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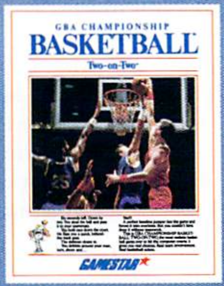
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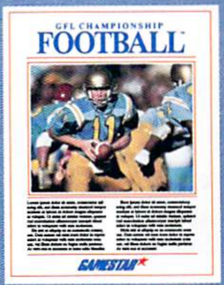
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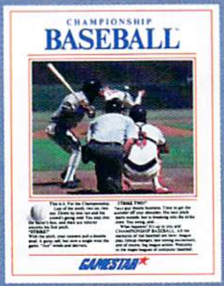
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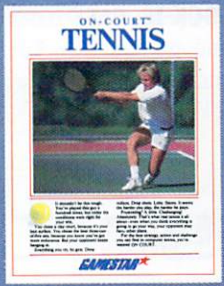
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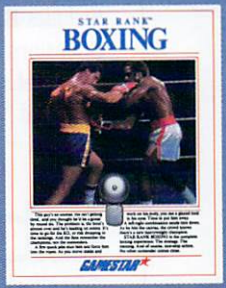
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```
OBJECT.AY 1,5
NEXT
```

Prioritizing BOBs

Just like the old Commodore 64, the Amiga can "prioritize" objects so that if any two objects are in the same location, one will appear in front of the other. Actually, you can give any number of objects a certain priority level; if you have 10 objects, each prioritized from one to 10, each object would be displayed in front of all the objects with lower numbers. The object with priority one, of course, would be behind everything else.

OBJECT.PRIORITY gives each BOB (sprites are not affected by this command) a priority and is followed by the object-id number and the value you want to give the object (which can range from -32768 to 32767). Therefore, if the following line were in a program:

```
OBJECT.PRIORITY 1,1 : OBJECT.PRIORITY 2,2
```

then object 1 would appear behind object 2 if they ever overlapped each other. This command is useful because you can create three-dimensional realism with certain objects appearing in front of or behind others. In a video game, for example, you might have little aliens moving near a spaceship; when they come in contact with that spaceship, you would probably want them to appear in front of it rather that disappear behind it, so you could give them a higher priority than the ship's BOB object. If you give two objects identical priority levels, they will appear in front of or behind each other randomly.

This next program illustrates the prioritizing of BOBs. First the two BOBs are loaded into memory:

```
OPEN "BOB1" FOR INPUT AS #1
OPEN "BOB2" FOR INPUT AS #2
OBJECT.SHAPE 1,INPUT$(LOF(1),1)
OBJECT.SHAPE 2,INPUT$(LOF(2),2)
CLOSE 1
CLOSE 2
OBJECT.ON
OBJECT.START
```

Next, we could give the second object priority over the first object:

```
OBJECT.PRIORITY 1,1
OBJECT.PRIORITY 2,2
```

When I wrote this program, I formed two UFOs using the ObjEdit program and saved them under the names "BOB1" and "BOB2." Therefore, this last part of the program made the two flying saucers move towards each other and, when they came into contact, the second BOB appeared in front of the first (Photo 2):

```
FOR A = 1 TO 50
OBJECT.X 1,A
OBJECT.X 2,151-A
OBJECT.Y 1,A
```

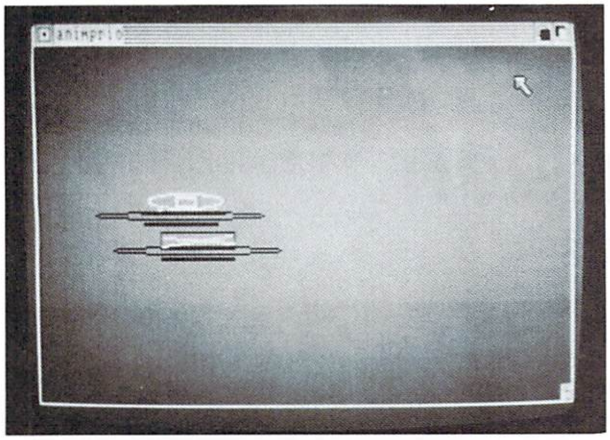


Photo 2.

```
OBJECT.Y 2,151-A
FOR D = 1 TO 30 : NEXT D
NEXT A
```

Collisions in Animation

Several important animation commands in Amiga Basic deal strictly with sprites and BOBs colliding with one another. COLLISION.ON tells the Amiga to be aware of any collisions that occur and execute the ON COLLISION GOSUB command, while COLLISION.OFF makes the Amiga ignore any collisions. The ON COLLISION GOSUB command instructs the Amiga to go to a specific line number or label whenever a collision occurs. You'll want to have some sort of routine to deal with the collision at the place where ON COLLISION GOSUB tells the Amiga to proceed.

The COLLISION command itself is followed by the object-id in parenthesis of the object you want to check. X = COLLISION (1), therefore, would store the collision value of object 1 into variable X. The "collision value" will be the identification number of the object that collides with the object you specify in the command. Therefore, if X is equal to 5, then (based on the X = COLLISION (1) command), object 1 collided with object 5. If the "collision value" is less than zero, the object you are specifying simply collided with one of the borders:

1. Top border
2. Left border
3. Bottom border
4. Right border

This next program uses the collision statements to keep a bouncing object within the borders of a window. I drew an object with ObjEdit called "THING," which resembled a spaceship; the first part of this program loads that object into memory after setting up a small window:

```
WINDOW 2,"SPACESHIP",(150,95)-(370,160),15
ON COLLISION GOSUB BOING
COLLISION ON
OPEN "THING" FOR INPUT AS #1
CLOSE 1
```

►

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◄ Next, we can establish the location (15,45) and velocity (x velocity is 50, y velocity is 50) and get the spaceship going:

```
OBJECT.X 1,15
OBJECT.Y 1,45
OBJECT.VX 1,50
OBJECT.VY 1,50
OBJECT.ON
OBJECT.START
```

The WHILE 1/SLEEP/WEND combination that follows just keeps the computer busy. However, when the object collides with one of borders of the window, it will go to the BOING routine, as specified by ON COLLISION GOSUB BOING in the second line of the program.

```
WHILE 1
  SLEEP
WEND
```

Finally, the BOING subroutine checks to see which border the object collided with. Based on this information, it simply reverses one of the directions (either the x- or y-direction) to move the ship back into the window again:

```
BOING:
  X = WINDOW(1)
  WINDOW 2
  I = COLLISION(0)
  IF I = 0 THEN RETURN
  J = COLLISION(1)
  IF J = -2 OR J = -4 THEN
  OBJECT.VX 1,OBJECT.VX(1)
  ELSE
  OBJECT.VY 1,OBJECT.VY(1)
  END IF
  OBJECT.START
  WINDOW X
RETURN
```

A slight modification of the same program limits the space in which the object can travel. The OBJECT.CLIP command defines a rectangle, which sets up an imaginary border that the object cannot move beyond. If the object comes into contact with the border, it acts as if it actually collided with the edge of the window; that is, it goes to the BOING routine and bounces off. The format of OBJECT.CLIP is OBJECT.CLIP (x1,y1)–(x2,y2), where (x1,y1) defines the upper-left pixel of the rectangle and (x2,y2) defines the lower-right pixel.

Here's the modified program with the OBJECT.CLIP inserted; notice when you run the program that the object bounces around within a much more confined area, even though the size of the "SPACESHIP" window has not been changed:

```
WINDOW 2,"SPACESHIP",(150,95)-(370,160),15
ON COLLISION GOSUB BOING
COLLISION ON
OPEN "THING" FOR INPUT AS #1
CLOSE 1
OBJECT.CLIP (10,10)-(50,50) 'this confines the area
OBJECT.X 1,15
OBJECT.Y 1,45
OBJECT.VX 1,50
OBJECT.VY 1,50
OBJECT.ON
OBJECT.START
WHILE 1
  SLEEP
WEND
BOING:
  X = WINDOW(1)
  WINDOW 2
  I = COLLISION(0)
  IF I = 0 THEN RETURN
```

►



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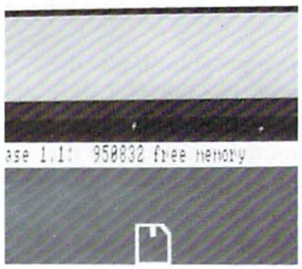
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```
    J = COLLISION(1)
    IF J = -2 OR J = -4 THEN
    OBJECT.VX 1,OBJECT.VX(1)
    ELSE
    OBJECT.VY 1,OBJECT.VY(1)
    END IF
    OBJECT.START
    WINDOW X
  RETURN
```

Here's another twist on the same program. This will load two objects into memory and bounce them around the confines of the window. Object 2 has priority over object 1, which means that the second ship will be in front of the first ship as they bounce around the screen and occasionally overlap. Because of a bug in Amiga Basic, the objects eventually (actually, within the first twenty seconds or less) bounce off into oblivion. However, you'll get to enjoy both objects for a little while.

```
  WINDOW 2,"SPACESHIP",(150,195)-(370,160),15
  ON COLLISION GOSUB BOING
  COLLISION ON
  OPEN "THING1" FOR INPUT AS #1
  OPEN "THING2" FOR INPUT AS #2
  OBJECT.SHAPE 1,INPUT$(LOF(1),1)
  OBJECT.SHAPE 2,INPUT$(LOF(2),2)
  CLOSE 1 : CLOSE 2
  OBJECT.PRIORITY 1,1
  OBJECT.PRIORITY 2,2
  OBJECT.X 1,15
  OBJECT.X 2,30
  OBJECT.Y 1,45
  OBJECT.Y 2,45
  OBJECT.VX 1,50
  OBJECT.VY 2,70
  OBJECT.VX 1,50
  OBJECT.VY 2,70
  OBJECT.ON
  OBJECT.START
  WHILE 1
    SLEEP
  WEND
  BOING:
    X = WINDOW(1)
    WINDOW 2
    I = COLLISION(0)
    IF I = 0 THEN RETURN
    J = COLLISION(1)
    IF J = -2 OR J = -4 THEN
    OBJECT.VX 1,OBJECT.VX(1)
    ELSE
    OBJECT.VY 1,OBJECT.VY(1)
    END IF
    OBJECT.START
    WINDOW X
  RETURN
```

Superimposing Objects

One of the best ways to create animation is the method that the makers of television cartoons use: superimpose slightly different images so that they create the effect of motion. If you want to have a stick figure walk across the screen, for example, you might have three BOBs in the shape of a stick man, each with arms and legs in slightly varied positions. You can put the first BOB on the screen, then the second, then the third, and then you can change the position slightly and print the three BOBs in the same fashion. This would create the illusion of the stick man walking, since his arms and legs are moving and he is moving in the direction of his "walk."

We can create stationary animation by having a talking face on the screen. By forming three BOBs (TALK1, TALK2 and TALK3) and putting them on the screen in the same location in the order 1, 2, 3, 1, 2, 3, etc., the illusion of a talking face is created. TALK1 can have a ►

Although Amiga Basic is somewhat temperamental about its collision detection, it won't take long until you're proficient at animation.

fully-closed mouth, TALK2 can have a slightly open mouth, while TALK3 can have a fully open mouth. Once the BOBs are formed, we can load them into memory in a separate program:

```
OPEN "TALK1" FOR INPUT AS #1
OPEN "TALK2" FOR INPUT AS #2
OPEN "TALK3" FOR INPUT AS #3
OBJECT.SHAPE 1,INPUT$(LOF(1),1)
OBJECT.SHAPE 2,INPUT$(LOF(2),2)
OBJECT.SHAPE 3,INPUT$(LOF(3),3)
CLOSE 1 : CLOSE 2 : CLOSE 3
```

Next, we can establish the coordinates for all three BOBs; the coordinates are all identical, so a FOR. . .NEXT loop can be used:

```
FOR I= 1 TO 3
OBJECT.X I,50
OBJECT.Y I,50
NEXT
```

Finally, by using the OBJECT.ON and OBJECT.OFF commands, we can turn the three objects on at separate times. The FOR. . .NEXT loop turns the first, second, then third object on then off, and then the process repeats itself indefinitely. This completes the illusion of the talking head:

```
REPEAT:
  FOR I= 1 TO 3
  OBJECT.ON I
  FOR D= 1 TO 50 : NEXT D
  OBJECT.OFF I
  NEXT I
GOTO REPEAT
```

Using Animation

This last program is a simple game I wrote to demonstrate how animation can be used. This game loads in a multicolored object that I created with the object editor. A few thin white strips are within the figure, and the object of the game is to point the mouse arrow at these small white strips and press the left button fast enough to "zap" a piece of white within the object.

Every time the button is pressed and the arrow is pointing exactly at any white part of the object, the score (displayed in the upper-left corner of the screen) is incremented. This game is a lot easier than you might think, but it's a fun way to see how animation can be combined with the other functions of the Amiga.

The first part of the program sets the collision features and loads in the figure:

```
ON COLLISION GOSUB REBOUND
COLLISION ON : MOUSE ON
OPEN "BOB" FOR INPUT AS #1
OBJECT.SHAPE 1,INPUT$(LOF(1),1)
CLOSE 1
```

Next, the Amiga asks what speed level should be used; 50 is a pretty good speed, and the higher the number is, the faster the object moves around the screen. Once the Amiga has the speed level, it sets the starting position of the object and its velocity levels in the X- and Y-directions.

```
INPUT "Speed level";SL : CLS
OBJECT.X 1,250
OBJECT.Y 1,250
OBJECT.VX 1,SL
OBJECT.VY 1,SL
OBJECT.ON
OBJECT.START
```

The computer then begins monitoring the mouse to see if the left button is pressed. When it is, the program assigns the color of the pixel where the arrow is pointing to the variable C. If C is equal to 1 (which is the color white), the score is incremented by one. Otherwise, the game just keeps going. One problem I encountered when writing this program was that the POINT command didn't seem to be working; after a lot of experimentation, I discovered that POINT works only with BOBs, and not sprites. So when you make the objects for this program, make sure they are BOBs. Finally, the REBOUND subroutine is the same as the BOING routine in earlier programs.

```
REPEAT
  IF MOUSE(0) THEN
    C = POINT(MOUSE(1),MOUSE(2))
  IF C = 1 THEN SCORE = SCORE + 1
  LOCATE 1,1 : PRINT SCORE;
GOTO REPEAT
REBOUND:
  I = COLLISION(0)
  IF I = 0 THEN RETURN
  J = COLLISION(1)
  IF J = -2 OR J = -4 THEN
  OBJECT.VX 1,-OBJECT.VX(1)
  ELSE
  OBJECT.VY 1,OBJECT.VY(1)
  END IF
  OBJECT.START
  WINDOW X
RETURN
```

Animation can be a lot of fun to experiment with. Although Amiga Basic is somewhat temperamental about its collision detection, it won't take very long until you're proficient at animation from BASIC. When you have a computer as powerful as the Amiga, it's worth it to struggle for a while to tap some of its great potential. ■

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C Structures

Welcome to part three of our continuing saga on the C language.

By Mark L. Van Name and William B. Catchings

Our C programming tutorial began with a discussion of C's major concepts and components. We then used these to build functions and complete programs. This time around we examine one more basic C construct. Then we discuss the use of some compiler preprocessor directives. We finish with a close look at some of the most important built-in functions in the C standard library.

Structures

It is often very convenient to group together related data items and treat them as a unit. Arrays are one way to group data, but all the elements must be of the same type. Sometimes that is not flexible enough. For example, you might want to group together all of the information that describes a part in a company's inventory. This information might include several different pieces, some of them characters and some numbers. In C, you group such related data items into *structures*. The different pieces of a structure are called its *members*, or sometimes its *elements* or *fields*.

A structure provides a template for grouping information. To get a variable modeled on this template, you must first define the template and then declare the variable. The first one is called the *structure declaration*, or *structure definition*. The second gives you an *instance*, or *variable*, of the structure. Although you define a structure only once, you may have many different instances of it.

A structure is defined by using the keyword *struct*, followed by its name and a {. The name you give it is called the structure's *tag*. You then define its elements and end with a }. Like nearly all C statements, this one must be terminated with a semicolon. You refer to the elements of a structure by name and declare each element as you would any C variable. The following code fragment defines a very simple inventory structure:

```
struct part {
   char name[30];
   int number;
   int quantity;
};
```

To get an instance of this structure later in your program, use a declaration like the following:

```
struct part part21;
```

You refer to an element of a structure instance with a special syntax. You type the name of the instance, followed by a period, and then the name of the desired element. Thus, you use *part21.number* and *part21.name* to refer to the *number* and *name* elements of the *part21* structure instance.

As we discussed last time, sometimes you would rather use a pointer to a variable than the variable's contents. This happens, for example, when you want a function to change a variable in the calling routine. The same is sometimes true of structures. To declare a pointer to a structure, you precede the name of the structure instance with the asterisk operator. The following example declares a pointer, *part_ptr*, to instances of our part structure:

```
struct part *part_ptr;
```

To access an element of a structure instance pointed to by a structure pointer, you must use another special syntax. You follow the name of the pointer with the characters -> and then the element name. For example, *part_ptr->name* refers to the *name* element of our *part* structure using the above pointer.

Just as you can declare an array of integers or characters, you also can declare an array of structure instances. Consider the following declaration:

```
struct part inventory[100];
```

This allocates one hundred instances of the *part* structure. You refer to elements of structure arrays just as you would to the elements of any other array. Once you have identified a particular array element, you use the normal syntax to refer to the elements of that instance. For example, you access the name of the third part in the *inventory* array with *inventory*[2].*name*.

In our inventory example, we defined the structure first and declared an instance of it later. We could have combined these two steps by putting *part21* between the closing } and the final semicolon. If we did so and did not plan to declare more instances of this structure, we could have omitted its tag. We also could have defined the structure without declaring any instances of it. Then we could have used this defintion elsewhere. In general, it is a good idea to define structures globally

so that you can declare instances as you need them. This is often done by putting structure definitions in an *include file* (see below).

The C Preprocessor

Most compilers are made up of three or four parts: the *preprocessor*, the *parser*, the *code generator* and, optionally, the *optimizer*. These parts are usually transparent as you use the compiler. However, you will find it useful to have a basic understanding of how a typical C compiler works. The preprocessor expands macros, substitutes values for constants, and generally gets your program into shape for the actual compilation. The parser then figures out what the code you wrote means. The code generator takes this interpretation and turns it into actual machine instructions. The optimizer, if present, takes either the interpretation or the machine code and applies some rules in an effort to make the code faster.

While some language compilers do not use a preprocessor, C compilers do. You give the preprocessor commands by using *compiler directives*. These are lines that begin with a pound sign (#), and then contain particular directives, such as *#include* or *#define*. As is the case with all C reserved words, these are all in lower case. Some compilers require that these directives start in column 1, and although this restriction is not uniform, it will be easier to move your programs to different compilers if you abide by it.

Include Files

One of the most important compiler directives is *#include*. You follow it with the name of a file, often called an *include* file. This directive instructs the preprocessor to act as if the contents of that file were inserted into your file at the point it occurs.

Most C programmers follow several program naming conventions. One of these is that source code file names have the extension *.c*, such as *main.c*. Likewise, include files generally have the extension *.h* (for *header*). While these conventions are by no means required, they are useful.

You must enclose the name of the include file either within angle brackets (< and >) or double quotes (""). The most commonly used directive illustrates the former:

```
#include <stdio.h>
```

The angle brackets indicate that this is a system include file. As such, it should be found in a "system directory" that typically comes with the compiler. The system include file *stdio.h* contains the constants and macros necessary for using the standard I/O functions. If the routines in your file access any library functions (discussed below), you should put this line near the beginning of your file.

You do pay something for using include files: you must open and read them each time you compile your program. If you unnecessarily use a *#include* directive, you can slow your program's compilation. On a disk-bound system such as the Amiga, this can be an important consideration.

Often you will want to build your own include files, which you can refer to by enclosing the file name in double quotes, such as: ►

Listing 1. diff program

```
/* This program will compare two files and report the first line
   in which they differ.  */

#include <stdio.h>            /* Get the standard I/O definitions */

#define MAXLINE 128             /* Define maximum line size */
#define YES     1               /* Some constants */
#define NO      0

#define FOREVER for(;;)       /* Macro that will go until a break */

main(argc,argv)
int argc;
char *argv[];
{
    FILE *fp1, *fp2, *fopen();  /* Two file pointers and fopen() */
    int line = 0, ret1 = 1, ret2 = 2;
    char file1 [MAXLINE], file2 [MAXLINE];        /* Input buffers */

     if (argc != 3)                 /* Right number of arguments? */
     {
          fprintf(stderr,"Usage: diff file1 file2\n");
          exit();
     }

     if ((fp1 = fopen (argv[1], "r")) == NULL)
```

Listing continued on p. 94

Listing continued from p. 93

```
        cant_open (argv[1]);        /* Inform the user of error */

    if ((fp2 = fopen (argv[2], "r")) == NULL)
            cant_open (argv[2]);

    FOREVER                             /* Do this until a break */
    {
        ret1 = (int) fgets (file1, MAXLINE, fp1);   /* Get a line */
        ret2 = (int) fgets (file2, MAXLINE, fp2);

          if (ret1 == NULL || ret2 == NULL)     /* On EOF break out */
              break;

          line++;
          if (equal (file1, file2) == NO)
          {
              printf ("Difference in line %d —\n", line);
              printf ("File 1: %s\nFile 2: %s\n", file1, file2);
              exit();
          }
    }
     /* Check if one file ended before the other.
        If not then they are the same */

         if (ret1 == NULL && ret2 != NULL)
              printf ("End of file encountered in file one\n");
         else if (ret2 == NULL && ret1 != NULL)
              printf ("End of file encountered in file two\n");
         else printf ("Files are the same\n");
     }

     /* Give an error naming the file we can't open */

     cant_open (file_name)
     char *file_name;
     {
         fprintf (stderr,"Can't open file %s\n",file_name);
         exit();
     }

     /* Compare two null terminated strings for equality */

     equal (line1, line2)
     char *line1, *line2;
     {
        while (*line1 != '\0')       /* Go until the end of string */
         if (*line1++ != *line2++)
              return (NO);                  /* Say no if not equal */

         if (*line1 == '\0' && *line2 == '\0')
             return (YES);          /* If both strings are done: equal */
         else return (NO);          /* Otherwise they are not */
     }
```

◄ #include "foo.h"

This tells the compiler to find the file *foo.h* in your personal directory. This is usually your current directory. Some compilers also offer command line options that let you tell them one or more directories that should be searched for any include files in your program.

You primarily use include files as a central place for keeping constants, structure definitions, external variable declarations, and macros that you want to use in several modules of a single program. You can also use include files effectively as basic programming building blocks for different C programs. For example, you could have an include file that contained your favorite ten programming constants (e.g., *YES*, *NO*, etc.).

Constants and Macros

The most widely used preprocessor directive is *#define*. It tells the preprocessor to perform *macro substitution* (i.e., to replace one character string with another). You use the simplest form of *#define* to define constants. The following example makes the preprocessor substitute *–1* wherever it encounters the "word" *EOF*:

```
#define EOF –1
```

By word, we mean that it must stand apart from other text and not be part of a quoted string. This declaration effectively makes *EOF* a constant equal to *–1*.

The preprocessor implements *#define* by performing textual substitution. Therefore, you also can use it to declare a synonym for a variable name. For example, you could use the following declaration to avoid typing *long_variable_name* too often:

```
#define lvn long_variable_name
```

Every time the preprocessor encounters *lvn* it will substitute *long_variable_name*. This simple textual substitution can be very powerful. Consider the function *getchar()* that we used in our *wordcount* sample program. It is actually defined, usually in *stdio.h*, as follows:

```
#define getchar() getc(stdin)
```

Just as it is nice to avoid typing some variable names, it can be useful to avoid repeating simple pieces of C code. For example, if you perform the same short math process many times in a program, you might like a shorthand way to refer to it. You could make the process a C function, but then you have to pay for the overhead of making a function call every time you use it. Fortunately, the only difference between this type of substitution and simple textual substitution is that you need to change the arguments on which the procedure works. The C preprocessor allows you to define such procedures, usually called *macros*. Macros typically have arguments, although they are not required. Consider the following simple C macro:

```
#define mult(x,y) (x) * (y)
```

Each time the preprocessor encounters the macro *mult* of two expressions, it replaces it with the first expression times the second. It would replace *mult(47,3)* with *(47) * (3)*.

The extra parentheses around *x* and *y* are not required. However, you can avoid a lot of trouble by using such seemingly superfluous parentheses. For example, if you omitted the parentheses, then the preprocessor would replace *mult(2+45,3)* with *2+45 * 3*, rather than the desired *(2+45) * 3*. You also should be careful not to leave a space between the name of the macro and the opening parenthesis. If you do, that parenthesis and all of the remaining text are treated as just text to be substituted for the macro name.

You may want to define a constant or macro for use only within a small part of a program. After that part, you want the effect of the *#define* to vanish. You can do this with the directive *#undef* followed by the name of the constant or macro.

Conditional Compilation

Sometimes you will want to write programs that contain pieces of code to be compiled only in certain circumstances. This is called *conditional compilation*. It is particularly useful for isolating code that will work only on a particular system or with a particular compiler. There are several preprocessor directives that allow you to compile parts of your code conditionally.

The name of the most important directive is, not suprisingly, *#if*. You follow *#if* with an expression and then the code to be compiled conditionally. You end this code with the directive *#endif*. If the expression evaluates to anything other than zero, then the code is compiled. Since the expression is evaluated as the program is compiled, it can contain only constants and no variables.

The following example causes the *printf* statement to be compiled only if *TEST* is defined as non-zero by a statement such as *#define TEST 1*.

```
#if TEST
printf ("Test is true");
#endif
```

A directive similar to *#if* is *#ifdef*, which is followed by a constant rather than an expression. It causes the associated code to be compiled only if the constant has been previously defined to any value. *#ifndef* is the inverse, with the associated code being compiled only if its constant has not been defined. You can also use the *#else* directive with any of these three to tell the preprocessor what to do in the other case. Consider the following:

```
#ifdef MANX
long var32bit;
#else
int var32bit;
#endif
```

If the constant *MANX* is defined, then the *long* declaration will be compiled. Otherwise, the *int* declaration will be compiled. You can use constructs such as these to work around the differences between compilers and even computers.

Runtime Library

The C preprocessor is not actually a part of the C language, but is an integral aspect of programming with C. Likewise, nearly all C compilers come with a standard runtime library. While not a part of the language, the functions in this library allow your C program to perform file, screen and keyboard I/O. There are also library functions for other basic system tasks, such as memory allocation and process control.

Stream I/O Revisited

In the first installment of this tutorial, we briefly dis- ►

cussed stream I/O, which provides a simple way to read from and write to a file by means of I/O redirection. Stream I/O redirection is done using two streams, *stdin* and *stdout*, that are opened automatically for you. You can use this same basic mechanism on additional streams of your own.

You open other streams with the *fopen(file_name,mode)* function. *file_name* is a string containing the name of the file to open and *mode* is a string that specifies the mode in which the file is to be opened. The mode limits the set of operations you can perform on the file. The open mode must be one of the following: "r" for read-only access, "w" for fullwrite access and "a" for append access. There is a structure called *FILE* that is defined in *stdio.h* and lets you work with files. *fopen* returns a pointer to a FILE, or file pointer. The following example opens the file *foo.dat* for write access:

```
FILE *fp;
fp = fopen ("foo.dat", "w");
```

If you try to *fopen* a file with either write or append mode, and the file does not exist, *fopen* will create it.

When you are done with a file, you can close it with the complementary function *fclose*, which takes as its only argument *fp*, the file pointer for that file. If you do not explicitly close an opened file, the system will close it for you when your program terminates normally. Many systems have a limit on the number of files that you can have open simultaneously. Because of this, if you plan to open many files in the course of your program, you probably should close each one as you finish with it.

Once you have opened a stream, you will want to read from it and write to it. To read a character you use the function *getc(fp)*, where *fp* is the file pointer for the stream. It returns the next available character, as in the following:

```
c = getc(fp);
```

When it encounters the end of the file, it returns *EOF*. This constant, which we saw in our sample *wordcount* program, is defined in *stdio.h*.

To write a character, you use the function *putc(c,fp)*, where *c* is the character you want to write and *fp* is the file pointer for your stream.

There are similar functions that allow you to read and write a line at a time. To read a line, use the function *fgets(line,max_chars,fp)*. To write a line, use *fputs(line,fp)*. In both cases, *fp* is the file pointer for your stream, *line* is the array of characters to be filled or written and *max_chars* is the maximum number of characters that you want to read.

You can use all of these functions on the three automatically opened streams as well as on those that you open. Just substitute *stdin, stdout* or *stderr* for the file pointer.

Our sample program this time, *diff*, uses several of these functions. It takes two file names as command line arguments and opens those files, either pronouncing them the same or identifying and displaying the first line on which they differ.

Low-Level I/O

Stream I/O works only with sequential I/O. It also is

buffered for you by the C runtime system. This means that even though you may read or write one character at a time, the runtime system is doing I/O in larger, more efficient chunks. There are times when you will want to deal with files in a non-sequential, or random, fashion. You also may want to control exactly how many characters are buffered. For those occasions, there are C functions that allow you to perform file I/O at a lower level.

These low-level I/O functions do not use file pointers. Instead, they require *file descriptors*, simple integer identifiers of the files with which you are working. To open such a file, you use the function *open(name,mode)*. *name* identifies the file and *mode* is an integer, rather than a string as in *fopen()*. Read-only access is represented by a 0, a 1 is used for write-only access, and 2 is for both reading and writing. *open()* returns a file descriptor for use with the other low-level functions.

```
int fd;
fd = open ("foo.dat", 2);
if (fd = = -1)
creat ("foo.dat", mode);
```

This example opens the file *foo.dat* for both read and write access and returns a file descriptor for it. If it does not exist, *open()* returns −1. In that case you must create it with the *creat()* function. Like *open()* it takes a file name as its first argument, but the mode may differ, depending on which compiler you are using. When you are done with the file, close it with the function *close(fd)*, where *fd* is a file descriptor.

You read and write from such a file with the *read(fd, buffer, num_chars)* and *write(fd, buffer, num_chars)* functions. The first argument, *fd*, is the file descriptor. The buffer is a pointer to a character buffer from which you wish to read or write. *num_chars* is the number of characters you want to transfer. Both functions return the number of characters that are successfully transferred. We show an example of each below:

```
actually_read = read (fd, buffer,
   maximum_to_read);
actually_written = write (fd, buffer,
   amount_to_write);
```

You may try to read more characters than are left in the file. If that happens, *read()* returns the amount read. When no more are left, *EOF* is returned. On the other hand, using the terms from our example, if *actually_written* does not equal *amount_to_write*, there has probably been some type of device error.

To access a file randomly, you must be able to change your position in the file. This can be done with the function *lseek(fd,offset,origin)*. *fd* is the usual file descriptor and *offset* is the position in the file that you want to reach, starting at the *origin*. *origin* can be 0, for the beginning of the file, 1 for your current position, or 2 for the end of the file. The first example below moves forward 100 characters, while the second moves to the end of the file: ►

```
lseek (fd, 100L, 1);
lseek (fd, (long) 0, 2);
```

It is important to know that the second argument, *offset*, is a C *long*. Constants are by default integers. Therefore, in our first example, we appended an *L* to force the constant 100 to be of type *long*. Our second example shows another alternative: you can use type casting to force the constant to be *long*. In the Lattice C compiler, *ints* and *longs* are the same. However, that is not true of all C compilers. For instance, they are, by default, different in the Manx Aztec C compiler. To be safe, you should get into the habit of forcing this argument to be *long*.

Other Built-in Functions

In our previous installments, we used the function *printf()*, which is actually one member of a three function family. The other two functions work similarly, except that they have an additional first argument that determines where the resulting output should go.

fprintf(fp, string) takes a file pointer, *fp*, as its first argument and puts *string* into the file identified by that pointer. We use it in our sample program, *diff*, to print out the error messages. *fprintf* is used rather than *printf* so that we can send the output to *stderr*, which cannot be redirected and eventually ends up on your screen. We send the rest of the output to *stdout*, which can be redirected into a file.

sprintf(char_ptr, string) is the third member of the *printf* family. It takes a character pointer, *char_ptr*, puts *string* into the location identified by *char_ptr* and returns the size of the resulting string.

The two examples below illustrate how to use these functions:

```
char str[100];

fprintf (fp, "Hello there world\n");
count = sprintf (str, "The answer is %d\n", x);
```

In *diff*, we use one other new function: *exit()*. This function terminates your program and closes any open files. In addition, you can give it an integer termination status argument. By convention, you return 0 to indicate that all is well, with other numbers indicating unsatisfactory termination.

And Next Time...

As you probably suspect, we have skipped some parts of the C language. However, we have covered all of its major components and much of its standard runtime library. You now have enough information on C to write serious programs. What we skipped you can find in a reference book or compiler manual. In our next and final installment, we will go beyond standard C and focus on how you can use some of the AmigaDOS functions from C to help your programs take greater advantage of your Amiga's capabilities.■

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True BASIC

If you can live without sprites, True BASIC could be all the Basic you'll ever need.

Despite the popularity of languages like C and Pascal, Basic is still the most popular programming language available for personal computers. Although not as powerful as some languages, Basic is understandable and easy to learn. In other words, it is the perfect language for those of us who are not professional programmers but who nevertheless need (or want) to program our computers.

Recently, a company founded by the originators of Basic—John Kemeny and Thomas Kurtz of True BASIC Inc.—introduced True BASIC for the Amiga. In the preface to the Reference Manual, they give their reasons for developing True BASIC. They point out the bastardization of the language that occured when it was ported to early microcomputers and how early compromises became accepted features of the language. Their goal is to replace the many versions of Basic on microcomputers with one version based upon the proposed ANSI (American National Standards Institute) standard for the Basic language.

Of course, you received a version of Basic—Amiga Basic—when you bought your Amiga. If you program with Amiga Basic, you're probably wondering if you should spend nearly $150 for another version of Basic. Surprisingly, in many cases, the answer is yes.

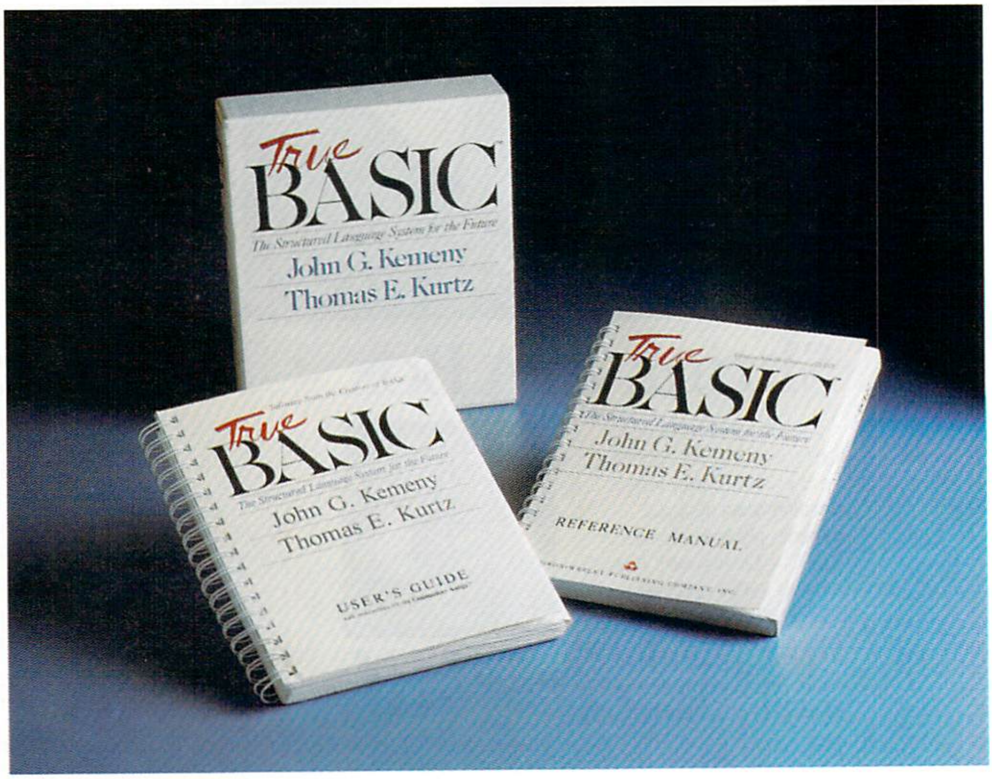
Description

Unlike most Basic implementations on microcomputers, True BASIC is a full-featured, structured programming language. It contains all the control structures you need to implement top-down, structured code. These include the basic structures such as FOR...NEXT and IF...THEN, as well as advanced structures such as DO...WHILE, DO...UNTIL, SELECT CASE, and just about any combination of IFs, THENs, ELSEIFs and ELSEs you can dream up. True BASIC also supports both internal and external subroutines and functions as well as external libraries. It even lets you call C and assembler routines from your True BASIC programs.

True BASIC is a portable language. Programs written under True BASIC on the Macintosh or IBM PC will run without modification under the Amiga version of the True BASIC Language System. To achieve this level of portability, some system-specific features are not implemented with the langauge. For example, you can't use sprites from True BASIC or use more than one of the Amiga's four sound channels. Surprisingly, though, True BASIC makes it a lot easier for you to program musical notes than does Amiga Basic.

True BASIC supports a full range of I/O statements, arithmetic and logical operators and mathematical functions. It also includes a number of statements that let you manipulate the contents of arrays. Special matrix statements perform matrix arithmetic and scalar multiplication, and transpose and invert two-dimensional arrays. With the external libraries that come with True BASIC, you have access to more mathematical and trigonometric functions than I knew existed.

The thing that surprised me the most about True BASIC is that it is an excellent ►



Circle 62 on Reader Service card.

graphics language—and it doesn't sacrifice portability in achieving its fine graphics performance. When you program graphics with True BASIC, you specify the grid that you will use to plot. For example, you could specify a grid that is 800 by 600 or one that is 1 by 1. You don't have to translate your coordinate system into the pixel locations of your output window; True BASIC does this automatically. That's how it can run the same graphics programs on different types of computers.

True BASIC supports the use of all the Amiga's graphics modes and colors. You can plot points and lines on your coordinate system and fill complicated areas to any color you want. True BASIC also lets you plot matrices and group plot statements together to form picture routines. Finally, True BASIC features a number of statements that let you perform graphics animation, although the results are not as sophisticated as the sprite and BOB animation possible with Amiga Basic. Don't buy True BASIC to write arcade games, but don't think that it can't produce great looking graphics, either.

Implementation

True BASIC compiles your programs into an intermediate code which is interpreted when run. By compiling programs before execution, True BASIC can report on errors before a program is run. True BASIC features complete and understandable error messages.

You have three windows available when you run True BASIC. You input your program into the Source window, get the results in the Output window, and enter immediate commands in the Command window. You can also use pull-down menus to enter commands. The Output window contains a full-screen editor. It includes scroll bars—a feature lacking on the Amiga Basic editor—and takes advantage of the Amiga's function keys.

One of the best features of any Basic is immediacy of response. When you type RUN (or choose it from a menu), you either get your output or a message (no matter how vague) telling you why your program didn't work. True BASIC compiles *very* quickly so you don't lose the immediacy of purely interpreted Basics.

True BASIC comes with two manuals: the True BASIC Reference Manual, which describes all the features of the language, and the User's Guide, a tutorial that teaches you how to use the True BASIC system and helps you learn the language. The True BASIC disk includes dozens of demonstration programs that you can run in conjunction with the User's Guide. The User's Guide also has specific information about the Amiga version of True BASIC. The two manuals are among the best documentation I've read for any technical product.

Evaluation

I ran four simple benchmark programs under both Amiga Basic and True BASIC. The first opened a file, wrote 1,000 lines of text, closed the file, then reopened it and read the 1,000 lines back into memory. The second performed 10,000 floating point multiplications and the third did 10,000 calls to a trigonometric (sine) function. The last program extracted a substring from a string 10,000 times. The programs were run under Workbench 1.1. Here are the results, in seconds:

	True BASIC	Amiga Basic
Disk Access	65.6	17.7
Floating Point	3.9	11.6
Trig Function	46.1	36.2
String Function	4.2	28.1

These timings are execution times; they don't include compilation times for True BASIC which, for these progams, never exceeded one second.

The results are mixed. While True BASIC was much faster handling floating point math (nearly 3 times) and strings (over 6 times), it was slower with trig functions and much slower (over 3 times) dealing with text files. When I ran the Disk Access program under a preliminary version of Workbench 1.2, True BASIC's performance improved nearly 30%, but still didn't match that of Amiga Basic. True BASIC seems to have more trouble communicating with the Amiga's hardware. The manuals state explicitly that the Amiga physical devices are not supported by True BASIC, although the RAM: device worked fine under later beta versions of Workbench 1.2.

I found program development to be easier under True BASIC than under Amiga Basic. True BASIC's editor is superior to Amiga Basic's, and True BASIC supports the Amiga Intuition interface much more fully than does Amiga Basic. The irony is that it is easier to develop Intuition-like programs under Amiga Basic. Although True BASIC supports mouse input, it doesn't have support for pull-down menus.

One of the best features of True BASIC is that memory-management is invisible: There is no CLEAR command to fiddle with. True BASIC will use as much memory as it needs, to the limits of your machine.

Conclusion

Should you buy True BASIC? If you're a casual programmer, or if you're interested in tak-

ing advantage of sprite animation and four-channel sound in your progams, then stick with Amiga Basic. If, on the other hand you're developing serious applications in Basic, or if you need a Basic to develop programs that can run on three popular personal computers (Mac, PC and Amiga), then True BASIC is the choice. If you're developing commercial software, then it's no contest; with a runtime system and developers toolkit nearly ready for release, True BASIC is a serious software development tool.

True BASIC is a natural for educators and students. While easy to learn, it is an excellent example of a full-featured, structured programming language. True BASIC has the feel of Pascal while retaining the immediacy and friendliness of Basic.

I like True BASIC, especially since my programming needs, though complex, don't require me to get intimately involved with all the features of my Amiga. I plan to use True BASIC to do my Basic programming. If you're needs are similar to mine, then you should consider it, too.

—B. Ryan, AmigaWorld

True BASIC
True BASIC Inc.
39 South Main St.
Hanover, NH 03755
800/TRBASIC (643-3884 in NH)
$149.90
Requires 512K

VIP Professional

High marks for this highly compatible 1-2-3 work-alike that deserves at least 1 megabyte to fulfill its potential.

By Ted Salamone

The Amiga has certainly come a long way since its inception. Despite these great strides, much remains to be done before its promise is fulfilled—especially in the area of business applications. VIP Professional, the 1-2-3 work-alike from VIP Technologies, has the power and sophistication to make that day arrive much sooner.

Primarily a spreadsheet with integrated graphics and database functions, Professional also offers limited word processing. Though it can handle complex tasks such as fixed asset depreciation calculations for multi-million-dollar companies, it is equally adept at small-business tasks. Homeowners aren't left out either: Professional can manage phone lists, produce graphs for school use, or compute payments on that second mortgage.

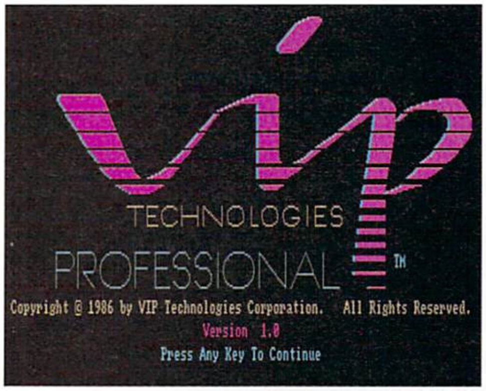
Plain Old Power

VIP Professional—for a refreshing change—seems to live up to its claims and do everything the hype says it will. While this means traditional menus instead of the pull-down type, verbal commands instead of icons and keystrokes where many expect mouse maneuvers, it also means an unprecedented degree of operational and file compatibility with 1-2-3. Lotus users will be instantaneously productive; novices can take advantage of 1-2-3's many third-party tutorials and productivity aids.

However, there is a down side to all of this: This program takes time to master, it has a so-called steep learning curve. Unless you glean all from the user manual, which is better than average, or related open-market materials, you will need considerable support from the vendor. (Don't expect much from the dealer, especially if the price was significantly lower than list.)

While the toll-call hotline support is free for a set period (12 months, 60 service minutes, five calls or five solutions), there is a $50 charge ($70 Canadian) for each and every similar service agreement thereafter. Balancing this business-oriented approach are the realistic replacement policy, the useful tutorial in the manual, a handy pull-out quick-reference card and the fact that the disk is not copy-protected.

An interactive demo, created via the macro feature, displays some of the fancier uses of macros. Unfortunately, it does little to explain their uses in controlling and directing spreadsheet activities.



Since the commands mimic 1-2-3 keystrokes, there are a few keyboard inconsistencies. For example, the Amiga does not have a scroll lock key. Instead, Amiga users must press Shift-Help. While the variations are clearly outlined on the reference card, a template would have made these adjust- ►

ments much more palatable. Such an overlay would also promote more use of the function keys. Considering the cost, I feel one should be provided.

Vital Statistics

Just in case the preceding remarks haven't convinced you of the serious nature of Professional, a few numbers should dispel any doubt. The spreadsheet runs 45 special functions (conditionals, trig, etc.) through 8,192 rows by 256 columns. The database handles up to 8,192 records, each with up to 256 fields. Searches, sorts and statistical analyses are possible. Bar, stacked, line, pie and x-y charts may be produced in color or black and white.

A separate program, Graphprint, allows you to produce hardcopy from the graphs and makes it easy to jazz them up. Label fonts may be changed, underlined, done in italic or bold—actual label text cannot be altered here. The Graphprint utility is the only part of the Professional package to make use of the mouse and pull-down menus.

Although Professional on a single disk already outshines 1-2-3 in convenience (partially due to the larger disk capacity), having to quit the main application (on an Amiga with 512K or less) to access Graphprint quickly becomes annoying.

The word-processing feature is really nothing more than clever use of the labelling, justification and formatting features designed for spreadsheet operations. This should best be thought of as a resident notepad; even Textcraft is blinding in comparison.

Professional ran smoothly and quickly in performing all of its assigned tasks. Activity (error) messages were in plain English, eliminating the usual need to frantically search through the manual's appendices for decryptions of esoteric codes.

Professionally Speaking

From my previous experience with 1-2-3 I can attest to the fact that the menu system and keystroke controls are identical. I ran Lotus version 2.0 on an IBM PC and used the macro instructions from VIP's manual. Adjustments did have to be made for hardware variations, such as different conventions for naming disk drives, but every macro I created executed flawlessly in 1-2-3. The compatibility factor seems at least as great as that for creating macros on different versions of 1-2-3!

Despite its value, Professional does have a few notable omissions. One is the Intuition interface. Many Amiga buyers will probably not want to live in the mouse-exclusive IBM/MS-DOS world. An icon-driven system, co-existing and interchangeable with the current command structure, would be appreciated, and, no doubt, greatly enhance the appeal of the product. Access to the print and graph-enhancement functions from within the main program (on 512K machines) is even more desirable. Finally, I would like to see a version that works with a RAM disk.

The Bottom Line

VIP Professional is what its name implies: a polished, well-executed piece from start to finish. Because of its "thoroughbred" nature, I took extra care in scrutinizing this product before writing this review. Even considering its omissions, there are few serious business products for any microcomputer that I would give a higher recommendation to than VIP Professional.

VIP Professional
VIP Technologies Corp.
132 Aero Camino
Santa Barbara, CA 93117
805/685-2489
$199.95
Requires 512K bare minimum; 1 meg+ for adequate spreadsheet space or multitasking.

The Music Studio

Musical composition with instrument design; almost a professional toolkit.

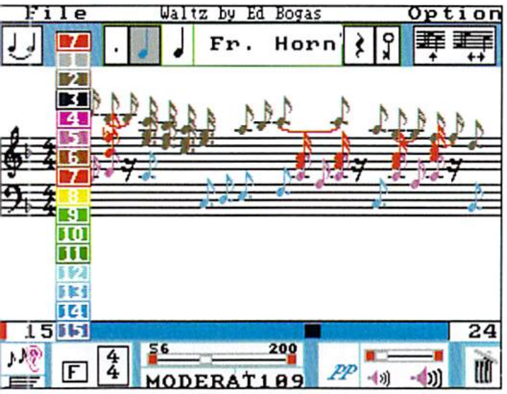
By Peggy Herrington

It's not quite what the advertisements claim, but Activision's Music Studio is an extensive, flexible music composition program for the 512K Amiga. You use the mouse to enter music symbols on a grand staff for four-part Amiga internally-produced songs, and can print them as sheet music with an Epson-compatible printer (I used a Star Micronics NX-10). Another nice feature is an instrument design section that lets you construct instrument voices using harmonic overtones, envelope control, vibrato and tremolo. If that's Greek to you, think of it as giving a sound some character. In addition to internally-produced music, up to 15-voice songs can be entered with the mouse, printed out, and played by music synthesizers connected to the Amiga with a MIDI interface. If you have a multitimbral synthesizer (like the Casio CZ-101), Music Studio can make it simulate a group of instruments playing together. The 78-page half-sized manual won't teach you music or MIDI, but it includes adequate instructions for music entry and instrument

design if you're familiar with them in general, and the table of contents is as detailed as many indexes I've used.

Five Easy Pieces

Music Studio is built around five beautifully designed screens. Notes are color-coordinated with the instruments they sound, making a color monitor a must—15 instruments and a background color are tough to differentiate in shades of green. You can expect to rely heavily on the mouse, but the function keys will toggle menus from which you select instruments, whole to 32nd notes and rests, accidentals, ties, measure bars, the ubiquitous dot, and block changes like transpose, cut, copy and paste. It accomodates triplets and song lyrics, but nothing can be changed while the music is playing, and tempo and key signature are constant throughout a piece.



1) The Main Composing Screen

You'll spend most of your time here, entering and listening to music, scrolling the notation across the screen during play if you wish. It's close, but notation is not quite standard: accidentals appear above noteheads (although they are properly placed on the print-outs) and all the stems go up and cannot be beamed. The absence of automatic bar placement for measures means more careful entry but the payoff is better sounding music, because you're not limited to the mechanistic timing that synthesized music is famous for. 512K allows for a maximum of 8,000 notes (diminished by lyrics) and 15 instrument sounds.

2) Instrument Design

This is where you design and test sounds, and unless you understand additive synthesis, you'll probably spend some time here experimenting. Changing a song's overall volume (from pp to ff) affects the entire piece, but the secret to altering it in midsong lies in design and arrangement of instruments. You can use up to 15 different instruments in each song, in any order, ►

choosing them from a "palette" and directing each to left or right stereo output. With the mouse you can alter the sounds that come with the program or design them from scratch using up to seven of the first 31 harmonic overtones from the natural frequency spectrum, shaping relative amplitudes through a 6-step envelope (portions of attack, decay, sustain and release) separately for the fundamental and each harmonic.

Transferring instrument sounds between palettes or .sound files is not documented, but it can be done. It's complicated by the fact that you can move them in one direction only, *from* the Design Screen buffer (which holds only the file called init.sound) *to* the Composing Screen buffer (which holds the other four .sound files used by the songs on the disk, one at a time). The solution is to change the file names. Load the non-init.sound file with the instrument(s) you want into the program and then resave it to another disk, naming it init.sound. When you load it back into the program as init.sound, it will automatically go into the Design Screen buffer where you can transfer what you want to the Composing Screen buffer and build a new palette.

Unlike most synthesizers, the Amiga can make fantastic drum sounds and I was disappointed that none were on the program disk. That brings up the biggest fault I found with Music Studio: It is neither IFF-compatible nor will it play digitized sound samples. (Those and other problems are being addressed by a public domain utility and a program upgrade, but more on those in a sec.)

3) MIDI Parameters

You set MIDI channel assignments and voices on this screen. Several Casio CZ-101 song files are provided on disk and they will work with other synthesizers, but you might have to adjust the voices. If you have a CZ-101, do make the suggested changes to the internal sounds—they make a dramatic difference. You can use Amiga-internal with MIDI-external sounds in songs, but only to a maximum of four voices or instruments. The program automatically redirects five or more voices to MIDI output. (This is being increased to eight in the upgrade.)

4) The Music Paintbox

Blocks of color are used on a music staff in this free-form composition area, and you can switch back and forth between it and the main screen to see your music in standard notation.

5) The File Menu

This is where you load, save, delete, append and rename your own and the 28 Amiga internal-sound song files and six MIDI files that come with the program. Most are original compositions by Ed Bogas (composer of children's and cartoon music) and Chris French (composer and jazz saxaphone player.)

Coda

Music Studio was conceived and programmed by Audio Light Inc., the company that did many fine programs for the Koala Pad. The disk is copy-protected. At this writing, Audio Light is preparing a freely distributable public domain utility program that will provide IFF and digitized sample compatibility to Music Studio, and a commercial low-cost upgrade that will allow multitasking, CLI access and printing with all Preference dot-matrix printers. I believe those products will make Music Studio the professional-quality musical "tool kit" it is advertised to be.

The Music Studio
Activision Inc.
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
415/960-0410
$49.95
Requires 512K

◀ MiAmiga File

A database (file) manager that has some very handy features, and some inconvenient ones too.

MiAmiga File is a program that lets you use your Amiga to store, manipulate and retrieve information. Although billed as a "database management system", it is really a file manager. True database management systems can manipulate information from many files at the same time—MiAmiga File is restricted to working with information from one file at a time. Nevertheless, MiAmiga File provides as much information management power as many Amiga owners will ever need.

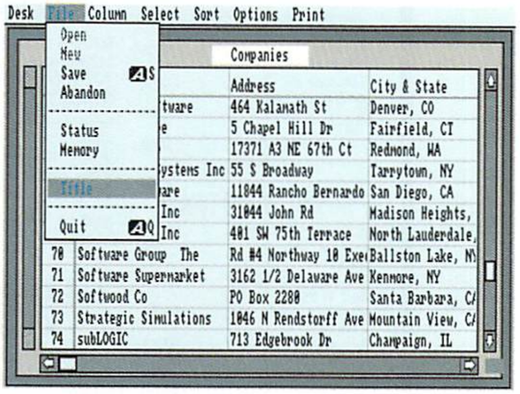
Data Organization

MiAmiga File organizes your data into fields, records and files. A field is the smallest data item; it could, for instance, contain a person's last name or zip code. Fields are combined to make records; a single record could consist of name, address, city, state and zip code fields. A file consists of one or more records. When you save data with MiAmiga File, you save it in file form.

As with any file manager, you have to define the fields that will make up the records in your file. MiAmiga File lets you name your fields and define eight types of fields: Text, Amount, Date, Time, Yes/No, Phone, Alpha and A/N (alphanumeric). The field types are used for automatic error checking. For example, if you define a field as an Amount field and then try to enter some alphabetic characters into it, MiAmiga File will let you know that you're making a data-entry mistake.

MiAmiga File uses the Amiga Intuition interface. All functions are accessible from pull-down menus. If a function, such as record selection, requires more input from you, the program uses dialog boxes to keep things simple and straightforward. If you've used a file management program before, you won't need the MiAmiga documentation to get started.

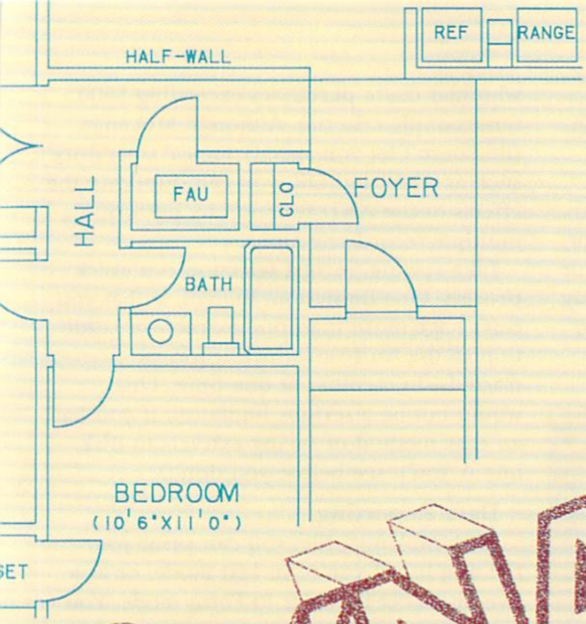
MiAmiga File lets you display your data in two ways: as a List or as a Form. In List mode, your data is organized like a spreadsheet: fields are represented by columns and records by rows (Photo 1). By using the vertical scroll bars to the right of the List, you can examine all the records in your file. If your records are longer than the width of the display, the horizontal scroll bar at the bottom of the screen lets you see the rest of the fields in your records. One of the nicest things about MiAmiga File is that you can change the layout of the List display at any time. You can add a new field to an existing data file; you can delete a field; you can even move fields around with your mouse. Better yet, you can change the width of the fields simply by dragging the grid lines with your mouse.



MiAmiga File is the most flexible file manager I've ever worked with.

In Form mode (Photo 2), MiAmiga File displays all the information about one record in your file. The program displays the names of the fields and their contents. As ▶

Circle 116 on Reader Service card.

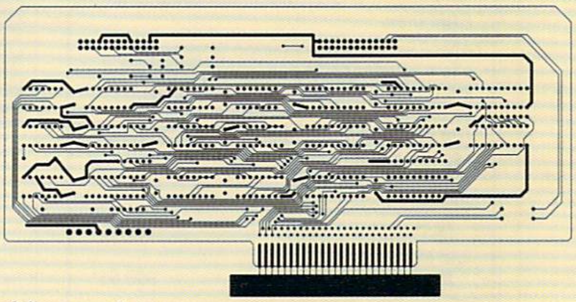


Finally, a proven CAD system for the Amiga

FROM MICRO-ILLUSIONS

DYNAMIC-CAD

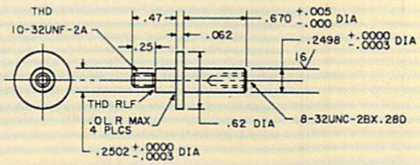
What AutoCAD* can do for the IBM*, Dynamic CAD can do with the Amiga... and a great deal more for less than a fourth of the price!



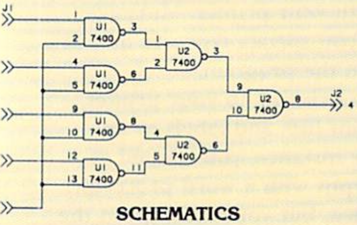
PRINTED CIRCUIT ARTWORK

Emerging from years of successful problem solving applications in piping, and electronics for the aerospace industry, DYNAMIC CAD has brought a highly advanced and powerful CAD system together with today's most dynamic and versatile micro-computer, the Amiga. DYNAMIC CAD takes full advantage of Amiga's extensive capabilities with color, multiple modes of resolution, mouse functions, and easily accessible pull-down menus.

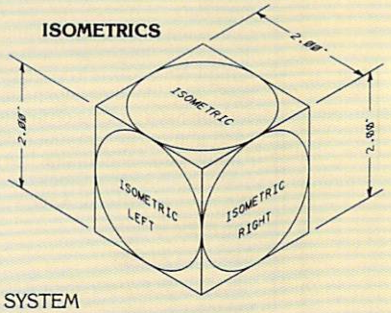
This is not some promised "vapor-ware." DYNAMIC CAD exists now and comes to the Amiga with a proven track record. The time and money-saving applications of DYNAMIC CAD for engineers and architects are truly astounding. Here is an advanced, 2-D drafting system with isometric capabilities that can be combined with many models of printers, plotters, and digitizers. In getting started you'll have the support of an extensive manual written in understandable English along with working examples as tutorial lessons.



MECHANICAL DRAFTING



SCHEMATICS



ISOMETRICS

SIGNAL NAME	COMP NAME	PIN NUMB	SOURCE	TYPE COMP
S0001	J1	2	*	CON
S0001	U1	1		7400
S0002	J1	3	*	CON
S0002	U1	4		7400
S0003	J1	4	*	CON
S0003	U1	9		7400
S0004	J1	5	*	CON
S0004	U1	12		7400
S0005	J1	9	*	CON
S0005	U1	2		7400
S0005	U1	5		7400
S0005	U1	10		7400
S0005	U1	13		7400
S0006	U1	3	*	7400
S0006	U2	1		7400
S0007	U1	6	*	7400
S0007	U2	2		7400
S0008	U1	8	*	7400
S0008	U2	4		7400
S0009	U1	11	*	7400
S0009	U2	5		7400
S0010	U2	3	*	7400
S0010	U2	9		7400
S0011	U2	6	*	7400
S0011	U2	10		7400
S0012	U2	8	*	7400
S0012	J2	4		CON

NET LIST FROM SCHEMATIC

WHAT DYNAMIC-CAD CAN DO FOR YOU

- D·C gives you all the expected CAD functions of zooming, rotating, panning, group functions and menu driven features.
- D·C brings you professional CAD capability tested and proven in the production of tens of thousands of drawings.
- D·C will liberate you from the need to draw free hand.
- D·C has net listing capability from your schematic.
- Schematic comparison to your printed circuit artwork for continuity check.
- D·C can produce isometric views.
- Mil-Spec quality Leroy® fonts.
- Automatic line dimensioning.
- D·C includes a series of information libraries: Symbols, Electronic Parts/Chips, Architectural Components, Landscaping, etc.
- Data base to store and retrieve information on parts specifications, vendors, and pricing.
- Data base system utilizes ASCII format files which are convertable to other standards.
- Capable of utilizing up to 4,096 colors.
- D·C can generate over 8,000 layers.
- D·C supports most standard dot matrix printers, ink jet, lazer jet, pen plotters, and the Gerber* Photoplotter.

SYSTEM REQUIREMENTS
512 K RAM
2 Disk Drives (or)
1 Drive and Hard Disk
Printer or Plotter

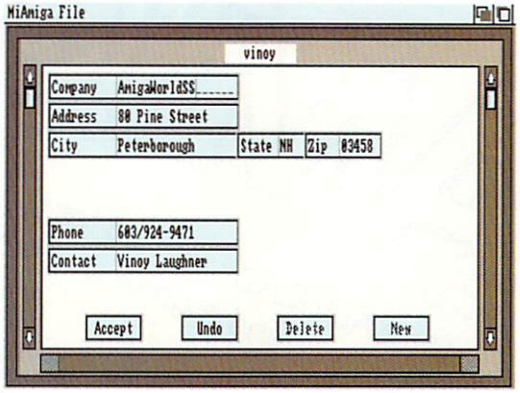
Inquiries invited. (818) 360-3715

microillusions

P.O. BOX 3475, GRANADA HILLS, CA 91344

Circle 37 on Reader Service card.

in the List mode, you can move fields around to your heart's content and change field widths with ease. The scroll bars in Form mode let you see any parts of a record that don't fit on one screen or move to another record. Moving around a form, for data entry or editing, is easy. Hitting Tab or Return brings you to the next field; clicking on a field name brings you immediately to that field.



Moving between the Form and List modes is easy. In Form mode, clicking near the bottom of the screen returns you to List mode. In List mode, clicking in the record number area displays the form for that record. You can also use menu choices and the keyboard to move between the displays.

Data Manipulation

MiAmiga File lets you sort your data based upon a key field that you select with the mouse. You can sort in either ascending or descending order. Better yet, you can sort your data on more than one field, with earlier sorts taking precedence over later ones. For instance, if you're keeping a mailing list with MiAmiga File, you could sort first by state and then by last name. What you'd wind up with is a list where all the names from Alabama were alphabetized, and then the ones from Alaska, and so on. The ability to perform multiple-key sorts is a very powerful feature not normally found in file managers. And since MiAmiga File is memory resident, sorting is extremely fast, even with large files.

MiAmiga File also lets you extract specific information from your data file based upon rules you provide. You first specify the field that will be the key to your data selection and then specify if the selection criteria is by range or by example. MiAmiga file then presents a dialog box where you enter your selection rules. For example, if you were keeping a customer file, you might want to extract the records of all customers who had made purchases between September 1st and 15th (a range criteria) or who had made purchases exceeding $500 (an example criteria). Although MiAmiga file doesn't let you specify logical operators such as AND and OR, you can duplicate the effects of the AND function by performing multiple-record selections.

Like sorting, record selection is a quick process. One limitation, though, is that you can't have more than one extract—in addition to the list from which it was extracted—in memory at one time. This would not be a serious limitation if you had an easy method of saving extracts to disk, but as you'll see below, you don't.

Data Reporting

With MiAmiga file, you can print your file as a list, if you're in List mode, or as a five-line label if you're in Form mode. You can also print the screen at any time. If you only want to print a part of your file, you have to perform your record selections before you print. In List mode, you have the option of hiding any field that you don't want printed. In Form mode, you simply move the fields you want printed into the first five lines of the form. The program automatically inserts a sixth blank line so that you can print on standard mailing labels.

When printing a list, you can specify that you want an 80-column report or a 132-column report. MiAmiga file will send lines of the appropriate width to your printer. You have to preset your printer from Preferences if you need to use condensed type to get 132 columns with your printer. MiAmiga File doesn't let you specify type-size or margins from within the program.

In addition to printing to your printer, you can also print lists and labels to an ASCII file if, for instance, you wanted to format your output with a word processor. This is a nice idea, but you aren't given the opportunity to name the ASCII file! It's always called MiAmiga.TXT. If you want to save more than one ASCII file during one session with the program, you're out of luck. The second time you save an ASCII file, you'll send the previous contents of the file into never-never land.

File Management

MiAmiga File is a great file manager that doesn't manage files well. That may sound contradictory, but it isn't. Once you have a file in memory, MiAmiga File is wonderful. Handling files on disk can be a nightmare.

The first problem is the file requester—the dialog box that pops up when you indicate that you want to load a previously saved file. The box asks for the name of the file to be loaded. This would be fine if I could remember the exact name of every file on my disks, but I can't. The file reques- ►

ter should list the contents of the current directory and let me choose the file I want to load with the mouse. MiAmiga File doesn't.

The second problem is more serious: MiAmiga File doesn't have a Save As option. The first time you create and save a file, the program asks you to enter a name for the file. From then on, it always saves the file with the *same* name. With Save As, you could save a file under two names—very useful for backup purposes—or you could save an extract from one file for later manipulation.

One final problem: Although the documentation says that you can start MiAmiga File by double clicking on the data-file icons, the program doesn't produce files with icons.

Conclusion

Due to the lack of a Save As option, and to the fact that I couldn't give unique names to ASCII files, I found that I spent a lot of time copying and renaming files from the CLI. If MiAmiga File were as flexible on the outside as it is on the inside, I could recommend it wholeheartedly. As things stand, I can only give it a conditional recommendation. If you can live without Save As or named ASCII files, buy it; if you need greater disk-file handling power, don't.

—B. Ryan, AmigaWorld

MiAmiga File
SoftWood Company
PO Box 2280
Santa Barbara, CA 93120
805/966-5884
$99.95
Requires 512K

Analyze! and Unicalc

A comparative look at two spreadsheets; which one suits you is the bottom line.

By Ted Salamone

Increased software competition is good news for all of us. In the Amiga market, this is especially true regarding business software—in this case spreadsheets. Unicalc was the first hardnosed business product on the Amiga market, and Lattice deserves credit for leading the way. Analyze!, from Micro-Systems Software, is in a family of business software including what is probably one of the Amiga's more popular products, the word processor Scribble!. (Scribble! will be reviewed in our next issue.) What follows is a comparison review of these two spreadsheets. After a look at similarities, Unicalc, since it was the first available, will be covered first.

Common Denominators

Unicalc and Analyze! both offer 8,192 rows by 256 columns, flexible printing options and a decent array of fundamental functions and mathematical operators. They adhere closely to the Amiga interface, work on 256K machines and are supported by their publishers in the form of upgrades and end user support (fee-based on-line or toll call telephone). Neither program is copy protected.

They both also support absolute and relative repositioning of formulas, protect cells from alteration, offer full edit capabilities (labels, values, formulas), complete range manipulation features (move, copy, erase) and various recalculation methods.

Unicalc

Lattice Inc., best known for compilers and programming utilities, has released version 1.10 of Unicalc. This upgrade adds pull-down menus and mouse-controlled cell positioning to its previous VisiCalc-like interface. (VisiCalc uses mnemonic-based commands prefixed by a virgule or slash (/); in VisiCalc, for example, /M is the move command). You can choose the approach you're most comfortable with.

Unicalc master disks contain a 256K routine in addition to an extended version (with the exact same features) that accesses extra RAM. A separate disk with 30 modifiable templates is available to get you up to speed quickly. These templates range from loan amortizations and expense logs to net worth statements and databases. While some have personal applications, most are geared toward the small business market. Borrowing a page from the IBM PC's book, Unicalc provides Page Up, Page Down, Home, End and other keys by pressing shifted numberpad keys. Shift-7, for instance, homes the cursor to the upper left cell. This arrangement adds very little to the program since the mouse and the Goto (specific cell) command are clearly superior.

No Experience Necessary

Unicalc is geared more towards the spreadsheet novice than Analyze! is, judging from its user manual and the extensive on-line help. While all the program's major features are covered, the manual lacks depth. The on-line help provides the same, if not more, information. The on-line help is context sensitive—you don't have to search through irrelevant material or use an index to find the desired topic. In other words, the program displays help screens based on the current operation: A valuable and convenient feature.

Departures

Unicalc goes beyond "plain vanilla" on several counts: inclusion of And, Choose, If False, Net Present Value, and True functions; database capabilities (including search, query, fill and the use of user-defined data tables); menu entry into the CLI; and windows. Its database routines supply the means to add values to cell ranges by merely designating start and stop figures along with the step value. ("Arrange for C5 to C25 to be filled with values starting at 100, capping at 1250 in individual increments of 125.") You may decide to test changing parameters by defining values in a table. For instance, Unicalc could then compute the payment amounts for a new car based on different interest rates and down payment amounts. Tables provide convenience and ensure accuracy. The window function allows users to split the current sheet into two vertical or horizontal partitions of varying sizes. By severing the scroll function, users may scroll (independently) in either one. You can set up one section with comments and working figures, and use the other window for calculations.

Left Field

Unicalc presents some interesting anomalies. Whereas the manual lacks truly meaty tutorials or working examples, it provides record format information—something better suited to technical tomes. Its ability to read and write DIF files and its overall flawless operation stand poles apart from its miserable graphing abilities. Commodore 64 programs perform better in this area. Graphs are displayed as asterisks in cells, one per unit value. If the cell is not wide enough to accommodate the proper num- of asterisks, the cell fills with symbols denoting an overflow or error. This is not acceptable. Also, there seems to be a lack of product focus: an Amiga interface joined to (Apple II) VisiCalc commands and partial IBM PC keyboard emulation. And it is somewhat difficult to set up and use. Despite some impressive abilities and smooth, trouble-free operation, Unicalc has some problems.

Analyze!

Analyze! is a product of Micro-Systems Software and is marketed by Brown-Wagh Publishing. I considered two versions of Analyze! in this review: versions 1.2 and beta 1.21. Version 1.21 allows you to pro-

duce four- or eight-color charts with up to six data ranges in three dimensions. It allows simultaneous viewing of up to four pie, bar, line, x-y, area, stacked or bar charts, and 3-D pie or 3-D bar graphs. 3-D bars can be yaw and pitch adjusted in single increments from 0 to 90 degrees to improve the view. Except where the inherent nature of a chart limits the number of entries per range or the number of ranges (x-y and pie, respectively), there are no data limits, memory restrictions aside.

After specifying data ranges, resolution, graph number (one to four) and type, you select View. In a few seconds the screen switches, displaying an eye-popping chart. (Eight-color pies are particularly impressive.) Switching back and forth from the worksheet, you can add labels, new ranges, or otherwise modify your masterpieces. Though worksheets and graph data are normally saved in IFF format, graphs can be archived independently in a special format. This makes it possible to have more than four graphs per spreadsheet; just save the extras to separate data disks.

The most impressive feature of Analyze!'s graphing is revealed after resizing the graph to view the worksheet. If you, for example, change a cell entry in a range used for the currently displayed graph, like magic the graph changes too! This "dynamic updating" is similar to the hotview feature in Lotus's Jazz for the Macintosh.

Analyze!'s manual is more comprehensive, explicit and useful than Unicalc's. It has to be—Analyze! has but one screen of on-line help, and it isn't very helpful. Going beyond the pull-down menus, Analyze! uses Function keys. These equivalents perform basic tasks such as edit, Goto, display defined range names, change relative to absolute, and recalculate. Additional functions can be activated with Amiga key combinations. These provide worksheet status information, allow hardcopy output, let you copy or erase ranges or quit. I have a complaint about this dual approach: It seems inconsistent. I'm not sure why the total of 10 commands were split between the Function keys and Amiga key combinations; after all, there are 10 Function keys.

Analyze! performs quickly and accurately. The cursor can be moved by mouse, shifted Arrow keys or the Goto command. The consequences of most menu options are self-evident; those which aren't can be learned from the advanced tutorials or reference sections of the manual.

Final Calculations

Where Unicalc has basic features, Analyze! adds depth: more recalculation options, more global format options, separate printer output of formulas or entire worksheets and 43 built-in functions. Included are If, False, True, Choose, Future Value, table lookup, Net Present Value, Payment, Present Value, Degrees, Radians, natural and base-10 logs, Standard Deviation and Variance. The statistical functions best demonstrate Analyze!'s advanced capabilities.

Unicalc works well and has the advantage of reading and writing DIF files; it seems aimed more at spreadsheet novices though it isn't exactly easy to set up and use. Its documentation lacks much depth. Its graphing is very poor. It is, however, $70 cheaper than Analyze!, so if DIF files are important to you and graphing is not, considering its overall smooth operation, the price might be right for you.

Analyze! works very well too. Overall it outperforms Unicalc. It doesn't, however, provide importing and exporting of DIF, SYLK and other file formats. It could have better on-line help, macros and database capabilities. It creates IFF files and has excellent color graphing that features dynamic updating. Therefore, if importing or exporting other file formats is of little value to you and you want very powerful graphing with a spreadsheet, go with Analyze!.

Unicalc
Lattice Inc.
PO Box 3072
Glen Ellyn, IL 60138
312/858-7950
$79.95
No special requirements

Analyze!
Brown-Wagh Publishing
16795 Lark Ave. #210
Los Gatos, CA 95030
800/451-0900
$149.95
No special requirements

Penmouse +

Is the Pen(mouse) mightier than the mouse? A squeak in the affirmative.

By Gary Ludwick

Imagine Michelangelo painting the Sistene Chapel ceiling with a roller and a six-inch brush. This might give you an idea of what it can be like for an artist trying to "paint" with a computer mouse. Creating masterpieces with the Amiga can be hard

going for those whose hands are accustomed to pens and #00 brushes. With the Penmouse + graphics tablet system, Kurta Corp. has provided a solution to this dilemma.

Penmouse Parts

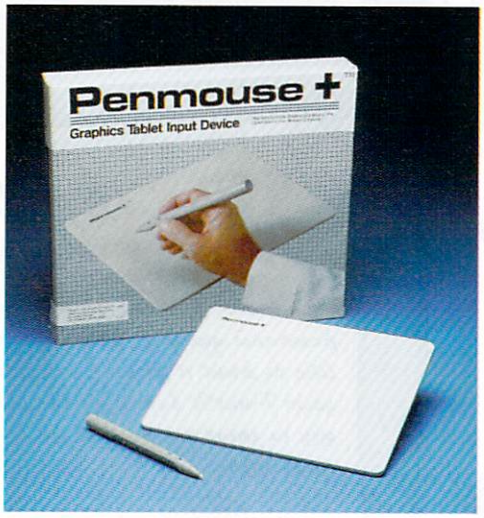
The Penmouse + system consists of three pieces: An 8½ × 11-inch graphics tablet, a pen (or stylus) and the software that drives the system. What makes Penmouse + different from other graphics tablets is that the pen is wireless. The system offers the artist a lot of freedom, flexibility and control, but can, under certain circumstances, also present some problems.

Hardware and Hookup

Hooking up to the Penmouse tablet couldn't be much easier. An adapter that connects to the RS-232 serial port on the Amiga is provided. Once the adapter is in place, the tablet attaches to it via a modular phone plug. That's it for physical set-up.

The Penmouse pen is larger than your everyday ballpoint—more the size of a long magic marker. Its tip is spring-loaded and performs the functions of the *left* mouse button. As you move the tip around the tablet, the on-screen cursor follows its every move. The cursor's position (unlike when controlled by the mouse) is tied to the pen's absolute position on the *tablet*. Pressing down on the tip begins the drawing, the dragging or the selection process.

On the barrel of the pen are two buttons. On the Amiga, these both perform the same function as the *right* mouse button. (Kurta has put two buttons here for those computer systems with fancy three-button mice.)



The pen itself can function in two modes: trace and draw. Trace is slightly slower in speed, but much higher in resolution. It evens out lines and diagonals for a smoother, finished look. Draw sacrifices that resolution for speed. Whereas the trace mode will sometimes lag behind the pen on the video display (due to the higher number of calculations being made by the tablet's microprocessor), the draw mode will keep up with the fastest sketch artist.

As mentioned earlier, the pen is wireless. It contains a pair of disk-type batteries that turn the unit on whenever any of the three buttons are pressed, and it will turn itself off after 1–3 minutes if it is not being used. The batteries are said to last about one year under normal use.

The pen's nylon stylus can also be replaced by a ballpoint refill cartridge—a clever touch sure to interest many artists. You can then simply tape a piece of drawing paper to the tablet, and the images produced by your drawing will be automatically transferred to the video display. This same method can also be used for tracing existing drawings that have been taped to the tablet.

Pencraft: The Driving Force

Pencraft—the driver program for all of Kurta's tablets—comes with Workbench installed and ready to boot under Kickstart 1.1. The first step is configuring Pencraft to ►

Hors d'oeuvres

Unique applications, tips and stuff

You may be using your Amiga at work, you may be using it at home, or you may be using it in the back seat of your car, but in some way or other, you are going to be using your Amiga in a slightly different way than anyone else. You are going to be running across little things that will help you to do something faster or easier or more elegantly.

AmigaWorld would like to share those shortcuts, ideas, unique applications, programming tips, things to avoid, things to try, etc., with everyone, and we'll reward you for your efforts with a colorful, appetizing, official *AmigaWorld* T-shirt. (Just remember to tell us your size.)

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Hors d'oeuvres
***AmigaWorld* editorial**
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your particular tablet, machine and personal taste.

When Pencraft is booted under Workbench, one of the displayed files is Install-Pencraft. Calling up this file takes you to a Workbench-type screen with various pull-down menus. These allow you to specify the type of tablet you are using (Penmouse +) and the data transfer rates (in baud), redefine the active area of the tablet and choose from several optional modes (tablet and mouse).

In actual use, most of these are unnecessary. Pencraft comes essentially configured for the Amiga, and outside of letting the software know you are using Penmouse + instead of one of its larger brothers, most of the menu choices have little function. In fact, according to the newly revised manual, the Penmouse will operate only in the tablet mode on the Amiga. It will not emulate a mouse as the menu indicates.

Once the specifications have been saved back to the program disk, Penmouse is ready for use. Because the Pencraft disk is not copy protected, it can be copied to your application disks if room permits, or it can be started on its own. For example, I copied the Pencraft and Pencraftdata files onto a DeluxePaint disk, along with the library command Run. Now when DeluxePaint boots to the CLI screen I can invoke Pencraft before DeluxePaint. Whether you install Pencraft via Workbench or CLI, it must precede the application program. And with programs like Aegis Animator, that can present some problems.

The Penmouse will work with programs like Animator as long as there is sufficient memory for both to co-exist. Since Animator can use 512K in a hurry, and since Pencraft requires space in RAM as well, cursor control can get very flakey, or non-existent. So far I have not had any crashes because of this problem, but I have had to resort to the mouse to get myself back in control or out of the program. As you may have already gathered, even though you may be using the pen and graphics tablet, the Amiga's mouse remains plugged in and can be used at any time.

Of Mice and Pens

So is the Pen mouse mightier than the mouse? For almost every drawing application the answer has to be a resounding yes.

Although I have worked with the Penmouse + system for several months, this review was done on their latest software effort, Pencraft 2.3. By the time you read this, all systems being shipped will contain this upgraded and debugged version along with a totally new manual. I'm glad to say that problems I had with version 1.2 of Pencraft were corrected in the current version.

If you should purchase a system with the old software, Kurta will gladly send you the upgrade and a new manual at no extra charge, once your registration is received.

Penmouse + is a must for any artist who wants to get the most out of the Amiga's graphics capabilities. It is also an excellent tool for those not quite so manually gifted who can use the tracing feature. Even in many non-graphics programs the Penmouse + offers some real advantages in cursor control over a mouse, and may be a good option for those who find desk space limited, or who are just more comfortable with a pen in their hand. Penmouse + is a very worthwhile addition to your Amiga.

Penmouse +
Kurta Corp.
4610 S. 35th St.
Phoenix, AZ 85040
602/276-5533
$350
Pencraft uses some RAM space

Financial Plus

A complete Financial *package at a fair price,* Plus *a word processor.*

By Ervin Bobo

I'm used to accounting software that takes up several disks—or several packages. Financial Plus, from Byte by Byte, is a full-featured accounting program plus a word processor, all on one disk. Because everything is on one disk, moving from one application to another is made easier. And because the procedures are integrated, an entry into an account affects the entire account, updating it as it is saved, so that there is no need for separate storage of Receivables, Payables or Payroll, and so that an entry into any one of these will also be entered in the General Ledger.

Descriptive menus take you to where you want to be, one step at a time, and these steps can be shortened in the interest of speed. As an example, the first menu presents you with six choices, the first of which is "Enter Transactions in Journals." Select this and the next menu gives you five choices, the first of which is "Customer Transactions." Select this and the screen flips to a menu of two choices, the second being "Collections from Customers." Easy enough, but once you've become familiar

with the program you can save steps to the same spot by entering "112" from the main menu.

Power and Simplicity

In working with the ledger sheets, the theme of power and simplicity is carried out, each entry that is made results in a prompt for the next entry so that there should never be any doubt about what to do next. Once you've entered all the information for a particular invoice, you are prompted for the next invoice number so that you can begin billing to or receiving from the next account.

Should you not remember the full name or the account number of a customer, pressing the Help key will set up a series of moves that will call up the directory of accounts or, if this is a new account, allow you to enter it into the system.

As easy as it is to use, Financial Plus has all the power and capabilities most businesses could want, being able to handle up to 32,000 transactions per accounting period as well as being able to handle 10,000 each of customer, vendor and employee accounts. Checks and statements may be printed as those accounting periods come around, and while the program provides templates for both of these, you may customize the forms to suit your own needs.

For those employee accounts, you may customize the FICA and FIT tables for each employee so that withholding is both accurate and automatic. There are also end-of-quarter and calendar-year payroll routines for tax reporting purposes.

At the end of the fiscal year, all year-end adjustments may be entered in the final period or you may set up a "thirteenth month" which will hold only the adjustments. Whichever method you choose, you are advised to make a backup disk at this point, because closing the fiscal year clears all current and historical balances from all income and expense accounts.

Security codes can be set, making it impossible for anyone without an assigned ID and password to get into your system. Financial Plus is not copy-protected.

The Plus

The second part of Financial Plus is Write Hand, a full-featured word processor that combines some of the best features of Wordstar and pfs:write. (Write Hand, which is also available separately for $50, will be reviewed next issue.) Because it is a part of Financial Plus, Write Hand also functions—through batch commands—as a form-letter generator that will merge with customer names and addresses from the accounting files you've created.

The Total

Financial Plus, though requiring 512K of RAM, does not make use of the mouse in either the financial or the word processing units and therefore has no pull-down or pop-up menus. But for those who don't mind doing without the mouse, the on-screen prompts and the routines that may be called up by the Help key may give you a bit of an edge in speed.

I found Financial Plus easy to use and found the documentation easy to follow. If your accounting work has been handled by an outside firm, causing you to be new to the operation, relax: The documentation takes you through every phase, showing you how to set up and maintain accounts. In addition, several sample accounts are included on the disk in order to give you a good feel for the system.

Considering the power and utility provided by this package, Financial Plus certainly has a fair price.■

Financial Plus
Byte by Byte Corp.
3736 Bee Cave Road, Suite 3
Austin, TX 78746
512/328-2938
$299.95
Requires 512K

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION

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What's New?

New products for the Amiga, that's what! We're learning about a lot of new goodies, and think you should too.

Compiled by Bob Ryan

Your Amiga's Buddy

Byte by Byte Corp. has announced the release of **PAL**, its hardware expansion chassis for the Amiga. Based upon the auto-configuring 100-pin expansion specification published by Commodore-Amiga, PAL includes 1 megabyte of RAM, a clock/calendar, five general-purpose DMA (Direct Memory Access) expansion slots and a pass through so you can further expand your Amiga. You can also get PAL with a built-in DMA controller and hard disk that doesn't use one of the five expansion slots.

In the near future, Byte by Byte will also offer some expansion cards for PAL. These include a general-purpose interface board, additional memory boards and a multifunction board. The multifunction board will let you choose any or all of the following: a 68881 math coprocessor, an IEE 488 port, a fine resolution clock for interfacing and four serial ports.

The PAL chassis with 1 megabyte RAM and clock/calendar is available for $1,436 (20% off the list price of $1,795). With a 20-megabyte hard disk, PAL lists for $3,195—the 20% introductory discount brings the price to $2,556. For more information about PAL and about **InfoMinder**, a unique data-retrieval system for the Amiga, contact Byte by Byte, 3736 Bee Cave Road, Suite 3, Austin, TX 78746. 512/328-2985.

Manage Anything

Datamat is a relational database management system from Transtime Technologies that can cover just about all of your data management needs. It has an identical interface across different operating systems including UNIX, XENIX and MS-DOS. It can handle an unlimited number of files in a database, with ten files open at any one time. You can relate data in different files in just about any manner you want. You can store and retrieve up to 13 data types, including IFF picture files.

The best thing about Datamat is that, unlike many full-featured database management systems, you don't have to be a programmer to use it. Datamat is fully menu driven. You define data relationships and extract information via easy-to-use menus. Datamat also lets you design your own data-entry screens and import information from external sources.

Datamat is available in three configurations: Datamat A200 ($250) is the basic package; Datamat A300 ($450) extends the

functions of A200 by adding graphing and statistics; Datamat A100 is a lower-end system with a more developed Amiga interface and costs $125. Also available are a batch system and a run-time system. For more information, contact Transtime Technologies, 797 Sheridan Drive, Tonawanda, NY 14150. 716/874-2010.

Pipe Dreams

Metacomco/Tenchstar Inc., the company that brought you AmigaDOS, has released **MCC Toolkit** for the Amiga. The package contains eight tools for the Amiga including Pipes, which adds UNIX-like pipes to AmigaDOS, AUX-CLI, which lets you run another terminal through your serial port, and a Disassembler. For more information, contact Metacomco/Tenchstar Inc., 201 Hoffman Ave., Monterey, CA 93940. 408/375-5012.

Programmable Database

dBMAN from Versasoft is a powerful dBASE II/III compatible database management system that lets you work with as many as ten data files at one time. dBMAN has an extensive programming language that lets you extract data to your exact specifications. It has a large array of operators and built-in functions to aid in data manipulation and report preparation. dBMAN also lets you easily construct data entry and retrieval menus.

dBMAN costs $149.95. The dBMAN run-time system costs an additional $149.95 and includes an unlimited run-time license. For more information, contact Versasoft, 723 Seawood Way, San Jose, CA 95120. 408/268-6033.

Screen Saver

Discovery Software has released **Grabbit**, a utility program that lets you save or print just about any Amiga screen display, even 4,096-color Hold-and-Modify (HAM) screens. Grabbit will save your screen as an IFF-picture file for manipulation by programs like Aegis Images and DeluxePaint, or it will print the screen with the printer you designated in Preferences.

Grabbit automatically gives pictures you save unique file names that let you know the resolution and number of colors in the picture. The print task automatically assumes a low priority so that it doesn't interfere with any other programs you're running. As a bonus, the Grabbit package includes **Anytime**, a ►

pop-up program that lets you adjust the palette of any Amiga screen any time you like. You simply choose the color you want to modify and use the RGB sliders to get the color you want.

Grabbit (with Anytime) costs $29.95. For more information, contact Discovery Software International, 262 South 15th St., Suite 400, Philadelphia, PA 19102. 215/546-1533.

Five of a Kind

Hardware maker ASDG Inc. has announced a handful of expansion products for the Amiga. All of them use the official Amiga expansion specifications. The first three products are a series of memory-expansion cards that you can plug into any expansion chassis built to Commodore-Amiga's specifications. The **Convertible .5M** ($450) gives your Amiga an additional half-megabyte of memory, **Convertible 1M** ($650) and **Convertible 2M** ($900) give you 1 and 2 additional megabytes, respectively. The .5M and 1M cards are upgradable to 2 megabytes. The cards feature 0-wait state memory. For a limited time, you can buy these memory cards at a 10% discount. User group members receive an additional 5% discount.

The last two products are **Mini-Rack** and **Mini-Rack B**. Both products let you convert 100-pin expansion cards into side-mounted boxes that attach to the Amiga expansion bus. The initial product, Mini-Rack B, costs $300 ($150 when purchased with a Convertible), has two expansion slots, contains a 6-amp power supply and is designed to work with most Amiga expansion cards. Mini-Rack costs $500 ($300 with a Convertible), has three slots and a 9-amp power supply, and is due out in October. It is *guaranteed* to work with any cards that follow Commodore-Amiga's expansion specifications. If you purchase a Mini-Rack B, you will get full credit if you upgrade to a Mini-Rack.

All ASDG products feature a one-year parts and labor warranty. For more information, contact ASDG Inc., 280 River Road, Suite 54A, Piscataway, NJ 08854. 201/540-9670.

File It

Micro-Systems Software, the developers of Analyze!, Scribble! and Online!, have announced **Organize!**, a new database program for the Amiga. Organize! files are based upon forms that you design and that are very easy to modify. Each form can contain up to 128 fields and/or 4,000 characters of information. Each field can be up to 254 characters long.

Organize! stores your data in dBase-compatible format. Each file can be as large as the capacity of your Amiga disks. Organize! can quickly retrieve and print information from your forms based upon criteria you provide. Like all Micro-Systems' products, Organize! uses the Amiga-Intuition interface and can run concurrently with other programs. In combination with Scribble!, Micro-Systems' word processor for the Amiga, Organize! lets you generate mail-merge files for producing customized form letters.

Organize! lists for $99.95 and requires 256K, although 512K is recommended. It can be easily moved to a hard disk. For more information, contact Micro-Systems Software, 4301-18 Oak Circle, Boca Raton, FL 33431. 800/327-8724.

LaserWriter Meets the Amiga

S. Anthony Studios of San Francisco, CA is shipping three products that let you connect your Amiga to an Apple LaserWriter printer. The first is **LaserUp! Graphics**. It lets you print any Amiga screen, even Hold-and-Modify displays, with the LaserWriter. You specify halftone screen type, X and Y scale, and position. The pro-

gram also saves files as PostScript images. LaserUp! Graphics lists for $79.95.

LaserUtilities Vol. 1 consists of PostScript procedures for formatting and printing text with the LaserWriter. (*PostScript* is the language that drives the LaserWriter.) Individual procedures can be combined to form complete PostScript programs. **LaserFonts Vol. 1** is a collection of three downloadable fonts for the Amiga. "Round" is a thin-lined, sans-serif font; "Classic" is a stylized, Roman-like font; and "Showtime" is based on the Broadway typeface. Included with the fonts is a PostScript language tutorial.

LaserUtilities Vol. 1 and LaserFonts Vol. 1 each costs $39.95. All these Amiga-LaserWriter products are available from S. Anthony Studios, 889 DeHaro St., San Francisco, CA 94107. 415/826-6193.

RAM Expander

Access Associates of Santa Clara, CA has released **Alegra**, a 512K external memory expansion box for the Amiga. Alegra conforms to the Commodore-Amiga auto-configuration specifications and is upgradable to 2 megabytes of RAM. It attaches to the expansion bus of your Amiga and draws less power than the output of the bus.

Alegra costs $395. For more information, contact Access Associates, 491 Aldo Ave., Santa Clara, CA 95054. 408/727-0256.

Spreadsheet Plus

Most spreadsheets these days follow the example of Lotus 1-2-3 by incorporating rudimentary data base and graphics functions into the package. **Logistix** from Grafox of England (marketed by Progressive Peripherals and Software of Denver, CO) adds another dimension to integrated spreadsheets—project management.

Logistix consists of a Lotus-like spreadsheet that can accommodate 1,024-column by 2,048-row templates. You can read Lotus, Supercalc, DIF (Data Interchange Format) and dBASE files into Logistix. The graphics module allows you to construct graphs in over 20 formats using up to nine character fonts.

The project management module lets you choose time increments from 30 minutes to years and takes into account non-working days. It performs critical-path analysis and, in conjunction with the spreadsheet, lets you construct various models of your projects and answer "what if" type questions.

Logistix retails for $249.95. For more information, contact Progressive Peripherals and Software, 464 Kalamath St., Denver, CO 80204. 303/825-4144.

Video Control

MediaPhile is a new product that lets you control a Sony 8mm video deck with your Amiga. All functions of the video deck, such as freeze frame and slow motion, can be controlled from the Amiga. MediaPhile is a combination software and hardware product. It contains a database that stores stop and start locations of a tape. You can playback desired locations on the tape by accessing the database. MediaPhile puts computer video control at your fingertips. It lists for $197. For more information, contact Interactive Microsystems, Box 272, Boxford, MA 01921.

Mouthing Off

Finally Software has announced three programs that take advantage of the Amiga's built-in speech synthesis. **Dr. Xes** is a program that emulates a Gestalt therapist. It is based upon Eliza, the famous AI program developed in the 1960s. **Talker** is a talking word processor. It reads text back to you by word, character or sentence. It's ideal for the seeing impaired.

The third program is **Señor Tutor**, which teaches conversa- ▶

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tional Spanish using Amiga speech synthesis. It varies lessons to keep your interest and drills you on everyday words and phrases. Dr. Xes and Señor Tutor each cost $49.95. Talker costs $69.95. Contact Finally Software, 4000 MacArthur Blvd., Suite 3000, Newport Beach, CA 92663. 714/854-4434.

That's What I Want

Money Mentor is a personal finance system produced by Sedona Software. It lets you track your money in up to 30 separate accounts and records transactions, keeps balances and projects expenses for each. The program warns you when you've exceeded your balance or budget projection and graphs the relationship between your projected expenses and what you actually spent. It produces both tabular and graphic reports of your financial condition.

Money Mentor lists for $95.95. For more information, contact Sedona Software, 11844 Rancho Bernardo Road, Suite 20, San Diego, CA 92128. 619/451-0151.

Shopping Around

Revolution Software has developed two special editors—**BOBSHOP** and **SOUNDSHOP**—for the Amiga. BOBSHOP uses BOBs (Blitter OBjects) created with one of the Amiga paint programs and lets you store, retrieve and animate these BOBs from your own programs.

SOUNDSHOP lets you create, modify, view and play custom Amiga waveforms. You can even break sounds apart and build new sounds from the pieces. You can sequence sounds with the Soundtrax utility and play them from your programs. The BOBSHOP/SOUNDSHOP package costs $49.95. For further information, contact Revolution Software, PO Box 38, West Chester, PA 19381. 215/430-0412.

Amiga Arcade

Electronic Arts has released **Marble Madness** and **Archon II: Adept** for the Amiga. Marble Madness is essentially the same game that appeared in coin-operated arcades last year. It demonstrates the fact that the Amiga's sound, color and animation rival that of dedicated arcade machines even though the Amiga is a general-purpose computer.

In Marble Madness, two players race against each other to complete a hair-raising 3-D course and win the game. In the one-player version, the player races against the clock. Joysticks are recommended and you need 512K to run the program. Marble Madness lists for $49.95.

Archon II: Adept, like the original Archon, is a combination arcade and strategy game. In Adept, however, you have to be more subtle and clever if you hope to win the battle between light and dark. Archon II: Adept is for one or two players and requires a joystick or two. It retails for $39.95 and requires 512K. For more information, contact Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. 415/571-7171.

I Want To Be A Football Hero

Gridiron! is a new release from Bethesda Softworks that combines strategy and action to make a comprehensive, real-time NFL football simulation. Playing against the computer or another person (which requires a joystick or a second mouse, available separately from Bethesda Softworks), you select your play and then control the player with the ball when playing offense, or any player when on defense. You can choose from the 40 built-in plays (20 offensive, 20 defensive) or design your own with the Electronic Chalkboard, a play creation and editing utility.

Plays occur on a stylized football field and are accompanied

by digitized sound. Each of the 22 players on the field is rated for physical characteristics and they all obey the laws of physics, as you'll see when you try to have your cornerback stop a sweep led by a 270-pound guard. You can edit the characteristics of your players or use the NFL team disk available from Bethesda Softworks. Gridiron! features five levels of play, from Practice to Professional, is mouse driven for ease of use and should satisfy even the most demanding "armchair quarterback."

Gridiron! is available from Bethesda Softworks for $69.95, with an introductory price of $49.95 to the first 500 purchasers. For more information, contact Bethesda Softworks, PO Box 1153, W. Bethesda, MD 20817. 800/992-4009 (in Maryland 301/469-7061). The program requires 512K.

Newsbriefs

CBS Interactive Learning has released **Mastering the SAT** for the Amiga. Retail price is $99.95. Contact CBS Interactive Learning, Publishing Division, CBS Inc., One Fawcett Place, Greenwich, CT 06836. 203/622-2500.

A **Pilot Interpreter** written in Amiga Basic is available from Westcomp, 573 N. Mountain Ave., #304, Upland, CA 91786. Two versions are available: one for $10, the other for $30.

Techni Soft, PO Box 7175, Murray UT 84123, has the following products: **T-Link** ($59.95), a telecommunications package; **T-Util** ($49.95), a file recovery program; and **T-Gpack**, a games package.

From Northwest Machine Specialties, 3611 Joshua NE, Salem, OR 97305, comes **Hex-Dump** ($19.95), a memory-examination utility, and **Screen Mapper** ($89.95), a screen-design utility. Both are written in Amiga Basic.

Meridian Software Inc., P.O. Box 890408, Houston, TX 77289 has released **Games Gallery I, II** and **III** for $29.95 each. Each disk has 15 games.

An updated **Key to C** package ($34.95) has been released by Data Research Processing Inc., 5121 Audrey Drive, Huntington Beach, CA 92649. Key to C provides functions and modules that take a lot of work out of C programming.

Bantam Books is distributing the **Online AmigaDOS** manual ($29.95), which has pop-up help screens for all the AmigaDOS commands, devices and formats.

Game Notes

In addition to the games mentioned above, I've heard that a lot of games are very close to release, even though they haven't been formally announced. **subLOGIC** is readying the long-awaited Jet and Flight Simulator II. I don't plan on getting any work done the week they're released. **Microprose** is working on Gunship, its attack helicopter simulation. **Accolade's** Mean 18 is a golfing simulation, and Earl Weaver Baseball from **Electronic Arts** is a baseball simulation. Look out APBA Baseball! **Origin Systems** is working on Auto Duel and two more Ultima games.

Activision is getting a bunch of games together: Championship Baseball '86, GBA Championship Basketball: Two on Two and Championship Golf: Pebble Beach (by Gamestar), Shanghai, a Chinese strategy game, Balance of Power, Hacker II and Tass Times in Tonetown, a unique and bizarre illustrated adventure.

Finally, **Mindscape** is marketing a new product line, Cinemaware, that could change your perception of adventure games. The preliminary graphics and animation are stunning. Look for The King of Chicago, Sinbad and the Throne of the Falcon, S-D-I and Defender of the Crown by Christmas.

The addresses and phone numbers of these game manufacturers are listed in the software guide in this issue. ■

Help Key

Once again, brave Bob fathoms the dark depths of Amiga mysteries. Send your puzzles on readable scrolls to Help Key, AmigaWorld, *80 Pine St., Peterborough, NH 03458.*

By Bob Ryan

AWOL Commands

Q: In the article "Window on AmigaDOS" in your May/June issue, you describe, among other things, the READ command. I was interested in the explanation of the command, so I checked a book on AmigaDOS and the C directory of my Workbench disk for more information. The book didn't mention the READ command and it wasn't in my C directory. Does this command exist or was this a mistake on your part? If it exists, how can I get a copy of the READ command?

Mark Palumbo
Masury, OH

A: There are four AmigaDOS commands from the list we published in May/June that you won't find on your Workbench disk. These are ALINK, ASSEM, DOWNLOAD and READ. These commands are part of AmigaDOS, but they're not included with disks that accompany your Amiga. These are developer's commands. They are supplied to developers as part of the Amiga development system. They are also included with some third-party language systems.

Version 1.2 of the operating system also contains some new AmigaDOS commands.

Basic Printing Revisited

Q: I am very interested in the solution you offered in the September/October Help Key for controlling printers from Amiga Basic. I tried the program on page 111 of that issue and it works, but I don't see the relationship between the program and the table printed with it. What is the connection?

Richard G. Plaisted
Williamsville, NY

A: The connection between the sample program that printed in boldface and the table is in column three of the table under the heading "Escape Sequence." This column contains the codes you have to put into your Basic programs to get special printer functions with the PRT: device. Here's a detailed explanation.

First, find the printer function you want from the Function column of the table. (In this case, let's stick with turning boldface on.) Find what you want to do in the Function column and then write down the corresponding code from the Escape Sequence column. The code for boldface on is ESC[1m. This is the code you have to send to the PRT: device from your Basic program. Since the escape key doesn't produce a character that you can see, it's best to substitute its ASCII code (27) when you use it in a pro-

gram. To send the other parts of the code, simply put the characters between quotation marks. Thus, ESC m from the table becomes CHR$(27) " " "1" "m" in your Amiga Basic print statement. Print this to the PRT: device and you'll be printing in boldface. By following this example, you can use any of the functions listed in the table from Amiga Basic.

Joystick Potential

Q: As you know, the Amiga can use a joystick for software interaction. Up to now, however, I've only been able to find game joysticks to work with my Amiga. These are the ones that have eight-direction motion. What I'm looking for is an analog joystick. Analog joysticks are better suited to working with CAD systems like Aegis Draw. Do you know of anyone who makes an analog joystick for the Amiga?

Jeffrey E. Brooks
Pendleton, SC

A: I'm afraid that you will have to be satisfied with your mouse or with the eight-direction joysticks available for the Amiga. The Amiga is not designed to work with analog joysticks like those used on the Apple II: it can only be used with eight-direction joysticks. Unfortunately, this limitation is not with the type of joystick, but with the Amiga.

Root of the Problem

Q: I have set up a drawer that I call my "Basic Work" drawer. It contains my copy of Amiga Basic and all my Basic programs. When I try to run these programs by double clicking on their associated icons, I get the message "Cannot open :AmigaBASIC, Error 205". I know I can run the programs by loading them into Amiga Basic, but why can't I open them via their icons?

Juhan K. Raidma
Middletown, NJ

A: Error 205 is an AmigaDOS error that means "object not found." When you click on an Amiga Basic program icon, the icon tells the system to load the tool associated with it. In other words, clicking on an Amiga Basic program icon forces your Amiga to first load (or try to load) the Amiga Basic program.

The problem you've encountered is caused by the fact that the icon tells the system that Amiga Basic can be found in the *root* directory of the current volume. But you've moved Amiga Basic from the root directory into another directory called "Basic Work." Since the system isn't instructed to find Amiga Basic there, it gives you the "object-not-found" error. To eliminate the error, simply move a copy of Amiga Basic into the root directory of the volume (in the disk window, but not in a drawer). ■

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4 9 14 19 24	154 159 164 169 174	304 309 314 319 324	454 459 464 469 474
5 10 15 20 25	155 160 165 170 175	305 310 315 320 325	455 460 465 470 475
26 31 36 41 46	176 181 186 191 196	326 331 336 341 346	476 481 486 491 496
27 32 37 42 47	177 182 187 192 197	327 332 337 342 347	477 482 487 492 497
28 33 38 43 48	178 183 188 193 198	328 333 338 343 348	478 483 488 493 498
29 34 39 44 49	179 184 189 194 199	329 334 339 344 349	479 484 489 494 499
30 35 40 45 50	180 185 190 195 200	330 335 340 345 350	480 485 490 495 500
51 56 61 66 71	201 206 211 216 221	351 356 361 366 371	501 506 511 516 521
52 57 62 67 72	202 207 212 217 222	352 357 362 367 372	502 507 512 517 522
53 58 63 68 73	203 208 213 218 223	353 358 363 368 373	503 508 513 518 523
54 59 64 69 74	204 209 214 219 224	354 359 364 369 374	504 509 514 519 524
55 60 65 70 75	205 210 215 220 225	355 360 365 370 375	505 510 515 520 525
76 81 86 91 96	226 231 236 241 246	376 381 386 391 396	526 531 536 541 546
77 82 87 92 97	227 232 237 242 247	377 382 387 392 397	527 532 537 542 547
78 83 88 93 98	228 233 238 243 248	378 383 388 393 398	528 533 538 543 548
79 84 89 94 99	229 234 239 244 249	379 384 389 394 399	529 534 539 544 549
80 85 90 95 100	230 235 240 245 250	380 385 390 395 400	530 535 540 545 550
101 106 111 116 121	251 256 261 266 271	401 406 411 416 421	551 556 561 566 571
102 107 112 117 122	252 257 262 267 272	402 407 412 417 422	552 557 562 567 572
103 108 113 118 123	253 258 263 268 273	403 408 413 418 423	553 558 563 568 573
104 109 114 119 124	254 259 264 269 274	404 409 414 419 424	554 559 564 569 574
105 110 115 120 125	255 260 265 270 275	405 410 415 420 425	555 560 565 570 575
126 131 136 141 146	276 281 286 291 296	426 431 436 441 446	576 581 586 591 596
127 132 137 142 147	277 282 287 292 297	427 432 437 442 447	577 582 587 592 597
128 133 138 143 148	278 283 288 293 298	428 433 438 443 448	578 583 588 593 598
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4 9 14 19 24	154 159 164 169 174	304 309 314 319 324	454 459 464 469 474
5 10 15 20 25	155 160 165 170 175	305 310 315 320 325	455 460 465 470 475
26 31 36 41 46	176 181 186 191 196	326 331 336 341 346	476 481 486 491 496
27 32 37 42 47	177 182 187 192 197	327 332 337 342 347	477 482 487 492 497
28 33 38 43 48	178 183 188 193 198	328 333 338 343 348	478 483 488 493 498
29 34 39 44 49	179 184 189 194 199	329 334 339 344 349	479 484 489 494 499
30 35 40 45 50	180 185 190 195 200	330 335 340 345 350	480 485 490 495 500
51 56 61 66 71	201 206 211 216 221	351 356 361 366 371	501 506 511 516 521
52 57 62 67 72	202 207 212 217 222	352 357 362 367 372	502 507 512 517 522
53 58 63 68 73	203 208 213 218 223	353 358 363 368 373	503 508 513 518 523
54 59 64 69 74	204 209 214 219 224	354 359 364 369 374	504 509 514 519 524
55 60 65 70 75	205 210 215 220 225	355 360 365 370 375	505 510 515 520 525
76 81 86 91 96	226 231 236 241 246	376 381 386 391 396	526 531 536 541 546
77 82 87 92 97	227 232 237 242 247	377 382 387 392 397	527 532 537 542 547
78 83 88 93 98	228 233 238 243 248	378 383 388 393 398	528 533 538 543 548
79 84 89 94 99	229 234 239 244 249	379 384 389 394 399	529 534 539 544 549
80 85 90 95 100	230 235 240 245 250	380 385 390 395 400	530 535 540 545 550
101 106 111 116 121	251 256 261 266 271	401 406 411 416 421	551 556 561 566 571
102 107 112 117 122	252 257 262 267 272	402 407 412 417 422	552 557 562 567 572
103 108 113 118 123	253 258 263 268 273	403 408 413 418 423	553 558 563 568 573
104 109 114 119 124	254 259 264 269 274	404 409 414 419 424	554 559 564 569 574
105 110 115 120 125	255 260 265 270 275	405 410 415 420 425	555 560 565 570 575
126 131 136 141 146	276 281 286 291 296	426 431 436 441 446	576 581 586 591 596
127 132 137 142 147	277 282 287 292 297	427 432 437 442 447	577 582 587 592 597
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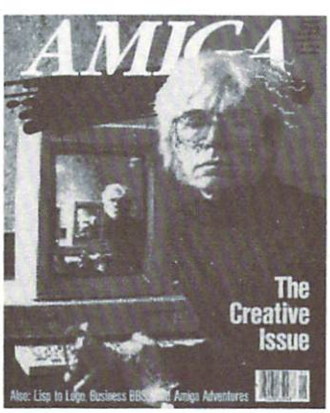
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